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[OFFICIAL NOTICE.]

Fourth Annual Meeting of the Iowa District Gas Association.

IOWA DISTRICT GAS ASSOCIATION,
OFFICE OF SECRETARY,
DES MOINES, IA., May 23, 1908.

The fourth annual meeting of the Iowa District Gas Association will be held at Hotel Rome, Omaha, Neb., June 17th, 18th and 19th, and will be called to order at 10 o'clock, A.M., by the President, Mr. Jansen Haines, of Des Moines, Ia.

The Hotel Rome is prepared to accommodate 100 guests for this meeting, to furnish a room suitable for the sessions of the Association, and announces the following rates:

European plan, rooms without bath	$1.50 and $2
Rooms with bath	$2.00 to $4
Double-bedded rooms, with bath	$3, $4 and $6

As more satisfactory arrangements can be obtained by securing rooms in advance of the meeting, members are requested to do so.

BRIEFLY TOLD.

POSTPONEMENT OF DATE, CANADA GAS ASSOCIATION MEETING!!!—All should pay due heed to the change in the official notice respecting the first annual meeting of the Canadian Gas Association. The time for holding the convention is set over one week, or until the 26th and 27th days of June, instead of June 19th and 20th, as originally arranged.

CURRENT COMMENT.—

THE May meeting of the New England Section of the Illuminating Engineering Society was held in Boston, the evening of the 27th ult., and despite fairly warm weather the attendance was excellent. The practical method of solving a workaday problem, which plan was initiated at the prior meeting with such successful results, was again tried. This time solutions were called for the best ways and means of lighting a drygoods store, of the retail order, of course. The solutions were many and ingenious, and were submitted by representatives of both the gas and electric lighting industries. Of course, plans of store to be lighted had been sent out by Secretary Ware well in advance of the meeting.

WITH regret we report the death of Mr. William F. Wright, who died at his home in Albany, N. Y., the morning of May 15th. Deceased, who was born in Albany, July 28th, 1847, had been connected with the gas supply of his native city for a lengthy period, having been appointed Superintendent of the opposition concern known as the Peoples Gas Company, in 1870. When the absorption of it by the Municipal Company was completed, Mr. Wright was named to the position of Superintendent of the latter's street division. He is survived by his widow, two sons and a daughter. The funeral services were held in his late residence, 11 Hall Place, Albany, the afternoon of the 17th ult., the Reverend Henry N. Dunning officiating.

OUR advices concerning the third annual meeting of the Natural Gas Association of America, which was held in Kansas City, Mo., May 19, 20 and 21, under the direction of President J. C. McDowell, are up to this writing decidedly meager, but enough is at hand to show that it was in all respects successful The attendance was well over 150, and the technical sessions were, if anything, a trifle prolonged on account of the volume of matter handed in for consideration. The dinner at the Savoy Hotel was participated in by 150, and the after proceedings connected therewith were well directed by the toastmaster, Col. John F. Parker. Another interesting feature of the convention was a visit to Scipio, Kas., under an invitation from the Kansas Natural Gas Company. The journey was well worth making on one account alone, and that was the inspection of the mammoth compressing station of the Company at Scipio, which plant represents an investment of well over $150,000. Other entertainment features were trolley rides *ad lib.*, and a jolly theater party. An excellent display of gas appliances was also a magnet for the delegates. The officers elected were: President, J. C. McDowell; Secretary-Treasurer, J. F. Owens; Directors, W. H. McKenzie, K. M. Mitchell, E. S. Springer, J. F. Owens and W. M. Welch. Possibly the paper which attracted the closest attention was that by Mr. J. B. Klumpp, of Philadelphia, whose subject was the "Installation and Distribution of Natural Gas." Besides its excellence of text, the descriptions were forcefully brought out by means of goodly number of well handled lantern slides.

Bureau of Information, The American Gas Institute.

BUREAU OF INFORMATION,
THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, 716 LOCUST STREET, ST. LOUIS, MO.
W. A. BAEHR, Chairman.

The current budget from the Bureau of Information, to hand, May 27th, contains Answers to Questions No. XI.. XVI. and XVIII. The first is here published, the others going over to next week:

Question No. XI.—"What is the practice concerning the making of insurance on gas plants of the latest fireproof design; and where no

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wood enters into the construction, are there any companies carrying their own insurance, or carrying no insurance at all?"

ANSWER BY THE BUREAU.

In compiling an answer to Question No. 11 the Bureau of Information found itself confronted by a number of complicated reports and opinions. The best of the data available, however, seems to indicate that only recently very few gas companies who have fireproof, or so-called fireproof construction, carried any insurance. At present there seems to be a tendency to carry some insurance on fireproof buildings, due to the number of bad fires with consequent damage in buildings which were believed to be entirely fireproof. Many insurance companies are making extremely low rates to attract this class of business, and many gas companies seem to look on it as a wise expenditure to take this extra precaution.

On the one hand, the experience of some companies is such that, to their knowledge, the actual damage from occasional fires is so small that it has not resulted in any change in the policy of not insuring gas works. On the other hand, the experience of others is to the effect that there are a number of cases of damage by fire to the buildings of even fireproof construction to warrant any company to provide against possible damage.

In most plants some parts of the works are not fireproof, such as coal trestles, small buildings, etc., but most companies carry ample insurance on this part of their plant.

The Bureau is able to cite the experience of the Western United Gas and Electric Company, which has carried its own fire insurance for over 3 years. The four gas works of this Company are generally fireproof, but the general comments made as to small buildings, trestles and coal sheds, are fully applicable. In addition to its works the Company has a number of office buildings, none of which is fire proof, although all but one are of good, solid, brick construction.

The widely scattered property of this Company, which operates in over 30 cities and towns, offers probably the ideal opportunity for self-insurance. All possible precautions against fire, and for the quick extinguishment of incipient fires, have been taken and the Company has been fortunate in that no loss has occurred. This fund now amounts to about $20,000, and the Company feels reasonably secure. During the early period of this fund outside insurance already in force was continued, the policies being gradually canceled as the fund was strengthened. Outside insurance is also carried on three buildings owned by the Company, but leased to other parties, for the reason that each represents a large possible loss, and the Company cannot control the precautions to be taken against fire by the occupants.

The self-insurance thus undertaken by the Company covers only fire insurance, and the fund is not designed to be used at any time for any loss that would not be paid by a fire insurance company under the standard form of policy. The Company carries boiler insurance in an outside company, but it does not carry liability insurance. The insurance fund draws interest, which is credited to the fund, and in due time it is expected that, with good fortune, the fund will be self-sustaining.

The Bureau wishes to call attention to the three answers received at large, which it recommends for careful consideration to all interested.

ANSWERS AT LARGE.

By An Independence Inspection Bureau, Philad lphia, Pa.—Conditions covering fire insurance on gas plants are noticeably changing and improving. In the past, fire underwriters, realizing that they had little or no experience to guide them, were fearful of the special hazards inherent in this class of property, and magnified the importance of these hazards. As a result, insurance rates were arbitrary, and as time went on, have been proven excessive in many instances. It remained for someone to tabulate the fire experience of such plants, to study the causes of fires therein, and to ascertain how the outbreak of such fires could reasonably be prevented and, if not entirely eliminated, properly controlled.

It is a fact that many fires and occasional explosions take place at gas works and that the majority of such could have been easily prevented. If fire insurance could be correctly adjusted to the hazards of individual risks, there would be just as much reason for insuring one property as another. Even the so-called "fireproof" plants are found, on careful examination, to have many opportunities for damage by fire and explosion (the latter can be insured against). The desirability of insurance on such plants is, therefore, largely dependent upon the rate of premium charged.

It has been the unique work of this bureau, working as specialists in the prevention of fires solely for the property owners, to study exhaustively the fire risks of gas works. This has resulted in the prepation and classification of a list of the causes of fires at gas works, and the proper preventative measures applicable to each. This study involves building construction, fire division, care of special and ordinary hazards of occupancy, fire protection and fire alarms.

It is very interesting to observe that a large number of gas works' fires are due to extraordinary causes, such as heating, lighting and power systems or poor housekeeping, just the things which statistics show also cause a large number of fires in other properties of special occupancy. For this reason a large part of the fire danger can be eliminated from the average plant without any hampering or operating conditions, or any material expenditure of money. Our clients have found such examinations to be "worth while," even at their so-called "fireproof" properties, as they discovered in time an unexpected amount of combustible material and unthought-of opportunities for annoying fires even at these buildings of superior construction. It is usual to find in conjunction with these plants a number of outbuildings, coal trestles and minor structures which are not in the least fireproof; and, then, certain rooms in the better buildings contain a considerable amount of combustible material.

A wide experience in the service of the owners of such properties, such as the United Gas Improvement Company, of Philadelphia, and the Peoples Gas Light and Coke Company, of Chicago, shows that the insurance companies, when properly approached, are willing to make at least very material reductions from existing rates on gas works; and in doing this they take into consideration both fire experience of the past and the individual merits of each plant.

It would seem a wise step to have a careful examination made of each property, no matter how well constructed, in order to learn what opportunities for fire really exist, and so as to enable the taking of such intelligent precautions as may be deemed wise against property loss and interruption of business; and also at the same time to ascertain the lowest rates of insurance and the broadest forms of policies obtainable from the insurance interests.

By Mr. John S. Zimmerman, Chicago, Ills.—In regard to the recent practice of the Peoples Gas Light and Coke Company as concerns fire insurance, I beg to submit the following data: Prior to the practical consolidation of the various gas companies now operated under the charter and title of "The Peoples Gas Light and Coke Company" there seems to have been no uniform or established method of action in this matter. Each Company had its own notions and pursued them irrespective of the ideas of every other one, and for some years after the consolidation (owing to a variety of reasons) the matter was allowed to run along, practically in the same lines with the several plants and detached properties of the various constituent companies. In the year 1905, however, I was called upon to analyze and make a general report on the whole subject, which afterwards was taken up by the Board of Directors, and the following general conclusions were reached:

First, that we should discontinue the practice of general fire insurance, maintaining it only on such places as were considered extra hazardous risks, and setting aside each month a given sum (in lieu of insurance premium saved), the accumulations of which would offset any losses which might occur upon non-insured property.

It was determined for the future none of the gas manufacturing plants, used solely as such, should be insured at all; and it was further decided to employ an insurance expert, familiar with all the rules and requirements of the Board of Underwriters, and that, guided by his advice, all changes of construction and storage of contents which would effect a practical reduction in the net cost of insurance should be made. In addition to this, it was recommended that all policies should be made to expire upon the same date in each year (as nearly as possible for the time being), in order to determine more exactly the proper amount to be carried at each place; and the average annual cost of the same.

Since the adoption of this policy it has been the aim of the Company to use only the best fireproof construction (approved by the Board of Underwriters), thereby securing the lowest legitimate rates.

It is our practice to insure our buildings, furniture and fixtures for terms of from 3 to 5 years, thus effecting a saving upon the annual cost, while the contents are insured, as usual for 1 year, upon a basis of 80 per cent. of the actual cash value of the average stock carried in each place; the figures in each case being derived from the previous year's monthly statements of stock carried at the respective locations, modified, of course, by subsequent changes which may have occurred.

As said before, no insurance whatever is placed upon the various manufacturing plants, nor upon the coal, coke, oil or other materials therein stored for daily use. On all other places, however, the usual policy of placing 80 per cent. of the proper value is pursued; but always complying with the rules of the Board of Underwriters, so far as these will result in a reduction of the cost of insurance. Thus far the present system has seemed to have worked satisfactorily, but the test of time alone will prove up actual working results.

By Mr. C. L. Holman, St. Louis, Mo.—Concerning the practice of the Laclede Gas Light Company with respect to insurance on gas plants I wish to submit the following: The Laclede Gas Light Company insures all structures that are not of fireproof or slow-burning construction, and their contents, under the 80 per cent. co-insurance clause, but excludes cost of excavation, foundations, concrete and brick floors, as well as contents of buildings which are of such a nature as would not render them liable to serious damage in case of fire. A reserve fund is carried to provide for any loss which may be sustained, not fully covered by policies. The amounts of the policies are, of course, decreased from time to time to meet changed conditions in quantity, or value of property. All policies are made to expire on the same date each year. It is the intention to hereafter use one general form to cover all property of the Company, excepting live stock, which may be transferred from one stable to another. To cover such cases, a separate policy will be carried. Insurance is carried on all boilers, and on elevators in general office building, but no other liability or indemnity insurance is in force. No insurance is carried on coal or coke stored in open yard.

[Continued from Page 890.]

FOURTH ANNUAL MEETING, SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION.

Held in El Paso, Tex., May 7, 8 and 9, 1908.

First Day—Afternoon Session.

The first business taken up in the afternoon session was the discussion of the topical question

WHAT POLICY SHOULD BE PURSUED BY PUBLIC SERVICE CORPORATIONS IN MAKING EXTENSIONS?

The participants therein were Messrs. Moore, of Austin; Jones and Kellogg, of El Paso; Moore and Stichter, of Dallas; Cooper and Lege, of Galveston; Wells, of Marshall; Edgar, of Fort Worth; Storm, of Amarillo; and Head, of Stephenville. The

QUESTION BOX,

edited by Mr. Kahn, was then taken up, and its contents aroused brisk and pointed discussions, notably so in respect of the experiences of the members respecting the calorific value of oil and the best method of handling it as a fuel. Another particularly interesting discussion had reference to the use and advantages of turbines, etc.

In the Matter of Exhibits Display.

Before the meeting closed for the afternoon the President took occasion to compliment the Associate Members present on the excellent exhibits they had prepared for the convention, and requested that every one present spend as much time as possible in the exhibit rooms, giving to those who have done so much to make the convention a success from an exhibit standpoint the assurances of the delegates that their presence and endeavors were appreciated in a substantial way.

On motion the convention adjourned until 10 A.M. of the following day.

Second Day—Morning Session.

The session opened with the paper on

GAS PRODUCERS AND GAS ENGINES,

written by Mr. W. B. Tuttle. As Mr. Tuttle was unable to attend the convention his paper was read by Mr. Kahn, of San Antonio.

In taking up the subject of gas engines and producers, it is not my intention to go into the details of gas engine operation, except in so far as it is necessary to deal with the action of producer gas in gas engines. This paper is intended mainly to deal with gas producers.

Almost all gas producers follow the same general form. There is, first, a generator, which is usually a round shell lined with firebrick and provided with a grate near the bottom and a charging door at the top. To the generator is usually connected an economizer. The economizer is frequently in the form of a small boiler, the tubes being connected to the flue leading from the generator. A scrubber is usually connected to the economizer. This is usually an iron shell filled with checkerwork of coke or some other substance over which water is sprayed. To the scrubber is usually connected a tar extractor, which may either be a rotary tar extractor or a tar extractor of the P. and A. type, in which the gas passes through holes in a plate and impinges on the surface of another plate; or simply a box filled with shavings. Some producers also have a purifying box in which oxide of iron is used to remove the sulphur from the gas. This, however, is not common. There are various modifications of the generator part of the producer. Different styles of shaking grates have been used, and in some cases the downdraft is used instead of an updraft. There are two general types of producers in use. First, the positive pressure producer; second, the suction producer. The positive pressure producer receives its air supply from a blower of some sort, usually either a centrifugal blower or a Koerting steam blower. The producer works under pressure all the time, and the gas, after leaving the tar extractor, is conveyed to a small holder or gas tank, from which it is supplied to the engine. The suction producer, as its name implies, is not under pressure at any time. This producer is connected direct to an engine without an intervening holder, and the air necessary for combustion is drawn into the producer by the suction of the engine.

In either type of producer the method of operating is about as follows: The generator is filled with fuel in some form, either coke or coal, and when this fuel has been ignited, air is supplied to the fuel bed, usually from below. This air passes into the incandescent fuel bed, and combustion immediately takes place. Most of the air unites to the carbon from the fuel, and burns to carbon dioxide, so that, at the top of the zone of combustion, almost all the air has been formed into carbon dioxide and nitrogen. The fuel bed, however, is deep, and the carbon dioxide and nitrogen have to pass through additional incandescent fuel, and in its passage the carbon dioxide is converted into carbon monoxide, the nitrogen remaining unchanged, so that we have emerging from the top of the fuel bed a gas composed of carbon monoxide and nitrogen. This is the theoretical result, if air is only used, and if all the carbon dioxide were converted into carbon monoxide in the fuel bed. As a matter of fact, however, in most producers, the fuel bed becomes so hot that the ash and fuel clinkers, unless some means is taken to prevent it. Most producers are, therefore, arranged so that steam generated in the economizer can be introduced into the fuel bed along with some carbon dioxide. As will be explained further on, this formation of hydrogen has an important effect on the operation of an engine running on producer gas. The fuel itself contains more or less moisture, and this also adds to some extent to the formation of hydrogen. Besides this, particularly where bituminous and lignite coals are used, with the air, this steam helps to keep the fuel bed below the temperature at which clinker forms readily, but the steam in passing through the fuel is decomposed, and carbon monoxide and hydrogen are both formed together, with which there is a certain amount of volatile matter driven off of the fuel, and a part of it passes over in the gas in the form of methane, while some is condensed out as the gas is cooled, in the form of tar. This tar has been one of the serious obstacles which confronted those who have attempted to use lignite or bituminous coals for producer gas; but it may, however, be satisfactorily extracted by passing the gas either through a rotary tar extractor or through a P. and A. tar extractor, or in some cases through a box containing shavings and sawdust.

Almost all kinds of coal can be successfully used in gas producers and the following results, taken from a report of the testing plant of the United States Geological Survey of the Louisiana Purchase Exposition, would indicate the relative values of Illinois coal, Indian Territory coal and Texas lignite.

Illinois Coal.

Average consumption of coal and gas:

Coal.	Per Cent.	Gas by Volume.	Per Cent.
Moisture	12.43	Carbon dioxide	9.72
Volatile matter	32.65	Oxygen	.12
Fixed carbon	45.70	Carbon monoxide	15.12
Ash	9.22	Hydrogen	9.98
Sulphur	1.41	Methane	6.00
	100.00	Nitrogen	59.06
			100.00

Coal consumed in producer, pounds per horse power per hour:

	Coal as Fired.	Dry Coal.	Combustible.
Per electric horse power developed at switch board	1.76	1.55	1.38
Per brake horse power developed at engine	1.50	1.31	1.17

Gas produced, cubic feet (reduced to standard):

Per pound consumed in producer	51.1
Per pound dry coal consumed in producer	58.4
Per pound combustible consumed in producer	65.3

B.T.U. per cubic foot of gas, 151.

Indian Territory Coal.

Average consumption of coal and gas:

Coal Per Cent.		Gas by Volume, Per Cent.	
Moisture	5.00	Carbon dioxide	8.25
Volatile matter	36.51	Oxygen	0.11
Fixed carbon	49.98	Carbon monoxide	19.39
Ash	8.51	Hydrogen	7.69
Sulphur	1.43	Methane	4.92
		Nitrogen	59.65

Coal consumed in producer, pounds per horse power per hour:

	Coal as Fired.	Dry Coal.	Combustible.
Per electric horse power developed at switchboard	1.77	1.69	1.53
Per brake horse power developed at engine	1.50	1.43	1.30

Gas produced, cubic feet (reduced to standard):

Per pound of coal consumed in producer	51.6
Per pound dry coal consumed in producer	54.1
Per pound combustible consumed in producer	59.4

B.T.U. per cubic foot of gas, 159.

Texas Lignite.

Average consumption of coal and gas:

Coal, Per Cent.		Gas by Volume, Per Cent.	
Moisture	33.50	Carbon dioxide	11.10
Volatile matter	32.34	Oxygen	0.22
Fixed carbon	23.80	Carbon monoxide	14.43
Ash	10.36	Hydrogen	10.54
Sulphur	0.63	Methane	7.48
		Nitrogen	56.22

Coal consumed in producer, pounds per horse power hour:

	Gas as Fired.	Dry Coal.	Combustible.
Per electric horse power developed at switchboard	2.98	1.99	1.68
Per brake horse power developed at engine	2.54	1.69	1.43

Gas produced, cubic feet (reduced to standard):

Per pound of coal consumed in producer	28.4
Per pound dry coal consumed in producer	42.7
Per pound combustible consumed in producer	50.6

B.T.U. per cubic foot of gas, 169.

The above figures show that Texas lignite can be used to advantage in gas producers.

In the operation of gas engines on producer gas it is extremely desirable to keep the amount of hydrogen at a minimum.

This can readily be accomplished where a positive blower producer is used, as the steam can be added just in sufficient proportion to take care of the fuel bed, and the amount of hydrogen can be kept at a minimum; but in the suction type of producer, where the load varies, it is extremely difficult to prevent having an excess of hydrogen in the gas at times, and much of the trouble that has been experienced in the operation of small gas engines equipped with suction producers comes from this source. Hydrogen and carbonic monoxide have both, approximately, the same calorific value; viz., about 320 B. T. U. per cubic foot. Carbon monoxide, however, when it burns, forms carbon dioxide, while hydrogen burns to water. The temperature of a gas engine is such that this water invariably leaves the engine in the form of steam, and, therefore, a large amount of latent heat is carried off in the steam as it leaves the engine. This heat so lost amounts to about 15 per cent. of the calorific value of hydrogen. Besides this, hydrogen gas burns very quickly while carbon monoxide burns slowly. As a result it is impossible to set the igniter in an engine using producer gas containing a large proportion of hydrogen at a point where the greatest efficiency can be obtained. If the igniters are set early enough, so that the carbon monoxide is completely burned up in the explosion, the hydrogen will be exploded too quickly, while if the igniters are set at a point where the hydrogen explodes at the proper time the carbon monoxide will not be entirely burned up before the exhaust valves are opened, and, as a consequence, it will pass out burning through the exhaust valves and into the exhaust pipe. The result is a loss in economy in the engine, and, furthermore, exhaust valves and pipes are burned out. This trouble is particularly noticeable in the case of engines running on suction producers. In this case the per cent. of hydrogen in the gas varies with the load on the engine, and it is very difficult to set the igniter so as to get anything like economical results. As a matter of fact, a gas may be very high in heat units and yet it may be impossible to put full load on the engine, on account of a high per cent. of hydrogen. The troubles resulting from the presence of a large amount of hydrogen in producer gas have led up to the invention of a method of operation, in which, instead of a jet of steam introduced under the fuel bed to keep down the temperature of the fuel, a part of the exhaust gas is returned and so introduced. The exhaust gas is composed principally of carbon dioxide and nitrogen. The mixture of the air and exhaust gas passes into the hot fuel bed, and the carbon dioxide which is thus introduced takes the place of the steam. Carbon dioxide unites with the carbon in the fuel to form carbon monoxide, and in this process heat is taken up which compensates in part for the heat given off, as the air and fuel burn to carbon dioxide, so that the fuel bed is kept at such a low temperature that the fusion of ash and the formation of clinker do not take place. The analyses below show the difference in the gas made in this way from ordinary producer gas.

Mixture of Air and Exhaust Gases Entering Producer.

	Per Cent.
Carbonic acid (CO_2)	3.3
Oxygen (O_2)	0.1
Carbonic oxide (CO)	0.1

Main Gas Supply to Engine, Using Exhaust Gases.

	Per Cent.
Carbonic acid (CO_2)	1.8
Oxygen (O_2)	1.2
Carbonic oxide (CO)	26.2
Hydrogen (H_2)	0.4
Marsh gas (CH_4)	0.7
Nitrogen (N)	60.7
Total	100.0
B.T.U. per cubic foot by gas calorimeter (high value)	103.7

Main Gas Supply to Engine, Ordinary System.

	Per Cent.
Carbonic acid (CO_2)	5.8
Oxygen (O_2)	1.3
Carbonic oxide (CO)	19.8
Hydrogen (H_2)	15.1
Marsh gas (CH_4)	1.3
Nitrogen (N)	56.7
Total	100.0
B.T.U. per cubic foot of gas by calorimeter (high value)	136.0

As a result of this method, several advantages are gained. In the first place, the igniters of the engine may be set at the proper time for the complete combustion of the carbon monoxide, and thus the greatest economy can be obtained; second, very little heat is lost through the latent heat carried off when steam forms at the time of the explosion; in the third place, gas leaves the producer at a lower temperature, less water is required in the scrubbing, and less heat is lost from the producer; in the fourth place, the economy of the engine may be very largely increased by increasing the compression. The compression of the engine may be raised up from 140 pounds, which is about the maximum that is used in ordinary practice, to 200 pounds, and not only is the efficiency of the engine very materially improved, but the capacity of the engine is also increased. Certain tests have been made showing that an increase of 38 per cent. in efficiency was gained, and that 25 per cent. increase in load carrying capacity was also gained. The following is a record showing the results obtained on the same engine which in one case was run on ordinary producer gas, and in another case on gas made without the presence of steam, and with the exhaust gas introduced:

Leading Data and Results of Economy Tests.

Conditions.	Exhaust Gases Used.	Ordinary System.
Date of test, 1906	Mch. 28–29	Apr. 5–6
	1906.	1906.
1. Duration, hours	25.5	14.05
2. Total time engine was running, hours	25.5	13.17
3. Maximum brake horse power developed	110.5	99.8
4. Minimum power developed, horse power	50.0	7.6
5. Average brake horse power developed for engine period	102.5	78.7
6. Average brake horse power for running period	102.5	84.1
7. Total weight of dry coal consumed, pounds	2,927.0	1,988.0
8. Total ash and refuse, pounds	391.0	317.0
9. Percentage of ash and refuse in dry coal	13.5	15.9
10. Weight of dry coal per hour, pounds	114.8	141.5
11. Dry coal consumed per brake horse power per hour, pounds	1.2	1.8
12. Combustible consumed per brake horse power per hour, pounds	0.97	1.51

The reliability of the service of gas engines operating on producer gas has been pretty well established, but in this connection it is well to call attentiou to the fact that all gas engines require greater care on the part of the operators than do steam engines. Steam engines, if they are supplied with steam and oil, will run in some sort of fashion as long as the load is not so great as to stall them; but gas engines will not run at all unless every part is in good working order, and while careful attention should be given to a steam plant, it must be given to a gas engine plant.

No discussion followed the paper, and the President remarked that the convention was the most successful, from a standpoint of attendance, that had ever been held by the Association, and announced his extreme gratification at this fact. [The total number in attendance was 140, 27 of whom were ladies.]

Undoubtedly the best paper of the convention was that entitled

WOOD PRESERVING,

written and read by Prof. E. B. Schoch. He extended somewhat on the written paper, his additions being principally in the form of further elucidation of some of the statements contained therein.

[We have not received the paper by Prof. Schoch. It will be given next week.]

The discussion lasted for fully an hour, and was participated in by Messrs. Lee, of Houston, Logan, of Texarkana, Cooper, of Galveston, Kellogg, of El Paso, Gerhard, of Austin, Ladd and Edgar, of Fort Worth, Carpenter, of Corsicana, the Secretary, Brown, of San Antonio, and Prof. Scott, of Austin.

Standardization of the High "T-Rail."

Following this discussion Mr. Cooper presented the report of the Committee on Standardization of the High "T-Rail," which recommended that the Secretary be instructed to address a letter to the National Association, stating the attitude of the Association in favor of that rail, and suggesting that the National Association secure from all minor Associations and railroads statements of a like tenor. The motion was seconded and carried, and the Secretary was so instructed. The convention then adjourned in a body to the exhibit rooms in the hotel to spend 15 minutes inspecting the displays.

Second Day—Afternoon Session

The afternoon session was opened by a resort to the Question Box. The subject of Automotineers was discussed thoroughly, various members giving their experience with them. It was participated in by Messrs. Duffy, Cooper, Kahn, Peel, Ing, Scott and Turner. The subject of arc headlights was then taken up and discussed by Messrs. Peel, Kellogg, Cooper, Kahn, Edgar and Turner. The next question was the discussion of meters. This was participated in by Messrs. Cooper, Kellogg, Moore, Conant, Scott and Kelley.

Elected to Honorary Membership.

After the Question Box discussion was closed the Secretary announced that the Executive Committee had recommended, for honorary membership in the Association, Prof. Eugene P. Schoch, of Austin, Tex., and on motion of Mr. Kahn he was delared elected.

The Supply Men in Charge.

The supply men then took charge of the meeting, Mr. Sam. Hobson taking the chair. This proved to be a most happy number on the programme, and Mr. Hobson showed that he well knew how to conduct a meeting. Addresses were made by Messrs. Bonner, of Houston, Mann, of New York, Rice, Cook, Gumm, McMakin, Arnold and Grayson. The addresses were all expressions of goodwill toward the active members. Mr. Bonner insisted that the next convention should go to Houston. Before yielding the chair Mr. Hobson stated he would like to see some action taken whereby the supply men could utilize their time granted them by the Association for purposes that would be beneficial to them as well as amusing. An adjournment to the following day was ordered.

Third Day, Morning Session.

The first order of business was the introduction by the President of Mr. C. W. Kellogg, Jr., who read the following paper on

VARIOUS FORMS OF ELECTRIC ILLUMINANTS AND THEIR EFFICIENCY.

The subject is such a broad one that its treatment in this paper must be necessarily very brief and condensed. The general physical principles underlying all lighting should be briefly stated so as to approach this subject in an intelligent manner. Every object above the absolute zero of temperature is constantly emitting energy by radiation through the ether. The vibration frequency of these radiations depends entirely upon the temperature of the body emitting the radiations, and it is with their frequency that we have to deal, as the amplitude of intensity of the radiations is largely a matter of the specific emissibility of the radiating substance and not a general quality. It is a well known fact that, after the frequency of vibration has increased, due to increased temperature, to a certain point, the radiations excite the optic nerves and the physiological sensation of light is produced in the brain, the first visible radiation being of the deep red color in the lower end of the spectrum. With the gradual increase In radiating frequency, the color corresponding varies through the usual spectrum colors, the highest visible frequency being at the upper end of the violet. Still higher vibration frequencies are emitted in some cases which are not visible, and which form the so-called ultra-violet light which will be referred to later. The higher the temperature of the radiating object the larger proportion the luminous radiations bear to the non-luminous heat radiations, and consequently the higher the efficiency obtained. Hence, we see that relatively high temperature means relatively high efficiency, as all the energy furnished to a light which goes to produce non-lumiuous radiations is lost for lighting purposes. The electric arc is known to produce the highest temperature possible for the blast furnace, and, as would be expected, the electric arc is the most efficient electric light yet produced.

It should be noted in passing that the usual commercial forms of electric light are produced solely by the transformation of the energy of the electric current into heat by its C^2R effect, and hence the general statements in the foregoing paragraph regarding the relative physical efficiencies of heat produced illuminants. It is, of course, physically possible to produce light by the direct production of high frequency oscillations, without the production of heat, such as the vibration of the ions in the Crooks or Geissler tubes, or in the various vacuum tubes which have been produced. But, as a rule, these lights are rich in ultra-violet light, which is, of course, non-luminous, and even the luminous rays produced are the upper end of the spectrum. The bright yellow rays are the ones that produce the most active physiological effect (which is what Mr. Jones, the merchant, wants to buy), so that the lights of the class just mentioned, which are high in ultra-violet and violet light, although theoretically more efficient than the heat produced lights, are useless commercially because of their weak effect on the human eye.

We see, therefore, that the development of forms of illuminants is largely a question of compromise between existing limits of losing power by heat on the one side and producing violet or ultra-violet radiations on the other, and also the paramount necessity of producing a quality of light which will make the maximum effect on the human eye.

When the first incandescent lamps were made by Mr. Edison, the question of efficiency was hardly considered in the struggle to obtain a filament which would not burn out after a few hours, and it was only after the carbon filament had been more or less perfected that the problem of saving in the power required to operate the lamp was taken up for solution. The improvements in filament lamps have followed the only line where success could be hoped for in this direction, namely, in obtaining materials for the filament which would stand a higher temperature than the carbon filament, and stand it without damage for a length of time which would make a lamp, using such a substance for a filament, a good commercial proposition. The "G. E. M." lamp, the Nernst lamp, the tantalum, osmium, tungsten and iridium lamps have all been designed on the principle already stated of a higher temperature for the luminous element and their relative efficiencies have followed mainly according to the temperature thus obtained. The specific emissibility of the various substances has entered into the problem more or less, especially in the case of the "G. E. M." lamps, but the temperature factor has been the important one.

The flaming arc, which is an even more efficient light than the ordinary arc lamp, gains its advantage from the physiological factor mentioned above, its temperature being the same as the ordinary form of arc lamp. It is a fact that, while the light from the ordinary arc lamp, when analyzed with the spectroscope, shows practically the same component parts as white light or sunlight, still it is (as anyone can see with the naked eye) much stronger than sunlight in the violet and ultra-violet radiations. Now the luminous or flaming arc simply employs for electrodes carbons impregnated with various metallic salts, which, when heated by the arc to incandescence, are specifically strong in the yellow rays of the spectrum, and the radiations of these incandescent metallic salts are added to the normal radiations of the electric arc, so as to give a great deal more useful light, useful because it has a more intense effect upon the optic nerves.

Lamps.	Watts per Candle Power.
Flaming arc	0.3
Ordinary arc	0.45
Tungsten incandescent	1.25
Nernst	1.75
Tantalum incandescent	2.00
"G. E. M." incandescent	2.5
Carbon incandescent	3.1 to 3.5

As the members of this Asscoiation are primarily interested in the sale of electric power for electric lighting, the commercial aspect of light efficiency is the all-important one for us. Looking at the above table of efficiencies, there are two important commercial considerations which have to be taken seriously into account, namely, quality of light and lamp renewals.

By quality of light, I mean its appearance to the customer and its diffusion over the surface to be illuminated. The business of electric lighting has found these factors to be so important that they are the controlling ones in the kind of light to be used in any particular case; that is, that illumination is the thing the customer buys, although electric power is what the company sells, and that the sale of electric power will be proportional to the satisfaction which that power can be made to give in illumination to the customer. It is this consideration which has led to the use of frosted, instead of clear, globes for incandescent lamps; spherical, instead of pear-shaped globes; opalescent, instead of clear arc light globes, and the like. The various forms of holophane reflectors are a movement along the same line and one and all are designed to make a desirable impression on the human eye. The light which sheds intense beams from a small point simply dazzles the eye and prevents it from obtaining the effect of the illumination actually produced, whereas if the luminous surface of a light is large, its intensity per unit of area may be made small enough not to prevent the eye from getting the effect of the illumination furnished by the light in question, so that often the most useful illuminants are actually less efficient than those where the radiating surface is too small. For this reason we observe that all the higher efficiency lamps have frosted globes which absorb from 5 to 6 per cent. of the light, and the use of clear inner globes for arc lamps, produces a less luminous effect than the opalescent globes; in fact, it is just this quality of a large luminous surface that makes the gas arc such an effective light, considering its comparatively low thermal efficiency.

Another interesting matter connected with the new high efficiency incandescent lamps is their stability under varying voltage conditions, as compared with the carbon filament lamps. With many plants the use of a Terrill regulator makes the question of variability of voltage less troublesome than where hand regulation is used; but, even under the best power station conditions, differences of voltage in various parts of the distribution system, or even in different parts of the distribution system, or even in different parts of a single large installation, are almost inevitable. For this reason there is no lighting system to which the factor of relative stability under various voltage conditions is not an advantage. The degrees of stability of various forms of lamps are as follows: Variation in candle power in per cent. for 1 volt variation in impressed voltage:

Kind of Lamp.	Per Cent.
Nernst	10.0
Carbon filament incandescent	6.3
"G. E. M." lamps	5.0
Tantalum	4.3
Osmium	4.0
Tungsten	4.0

The advent of the high efficiency incandescent lamps has opened up a wide field for speculation as to what the policy of the electric light companies will be or should be regarding lamp renewals. It can be stated in a general way that most electric light companies at the present time renew ordinary incandescent lamps free and furnish arc and Nernst lamps free, and maintain them free for customers. Below is a table largely theoretical, but based upon actual lamp performances, showing how the cost per kilowatt hour for lamp renewals varies. Renewals in the case of arc and Nernst lamps include labor and material: Arc lamps, 0.45 watts per candle; renewals per kw. hour, 0.71 cent. Flaming arcs, 0.3 watt per candle; renewals per kw. hour, 9.3 cents. Nernst lamps, 1.75 watts per candle; renewals, per kw. hour, 0.6 cent.

Filament Lamps.

Candle Power.	Kind of Filament.	Watts per C. P.	Life, Hours.	Cost of Lamp.	Renewals per Kw. Hour.
16	Carbon	3.5	1,163	$.16	.246
16	"	3.1	585	.16	.55
32	"	3.5	1,200	.24	.175
32	"	3.1	595	.24	.45
20	Metallized	2.5	560	.20	.71
40	"	2.5	575	.28	.49
50	"	2.5	560	.36	.51
75	"	2.5	560	.62	.52
100	"	2.5	560	.64	.46
20	Tantalum, D. C.	2.0	1,400	.48	.86
40	" A. C.	2.0	1,600	.68	.53
20	" A. C.	2.0	600	.48	2.00
40	" A. C.	2.0	900	.68	.94
32	Tungsten	1 25	1,000	1.20	3.00
48	"	1.25	1,000	1.40	2.33
80	"	1.25	1,000	2.00	2.00

It can be seen from a glance at the above table that the free renewal costs for the new lamps are prohibitive. Some of the larger Eastern companies have adopted the system of charging for the high efficiency lamps the difference in cost between the high efficiency lamp and the same candle power of carbon filament, which I think can be justified to the customer as follows, as being a good thing for him—32-candle power lamps:

	Carbon Filament Lamp, 115 Watts.	Tungsten Lamp, 40 Watts
1,000 hours, 10 cents per kw. hour	$11.50	$4.00
Cost of renewals	....	1.00
Total cost for 1,000 hours	11.50	5.00
Cost per 1,000-candle power hours	0.36	0.157

I feel that, in spite of some people being able to cut down their bills thereby, it is good policy for the companies to help to introduce every possible improvement in the art of lighting as rapidly as possible. It shows the people how satisfactorily the art is developing and helps to keep them actively interested in the question of more light and better light. It also gives the impression that the company is not interested solely in keeping its meter disks spinning, but also in furnishing the best lighting service which the times and the progress of the art will permit, and that is a question of fundamental importance.

Discussion.

The discussion on this paper, which took the form as to the advisability of furnishing free renewals to customers, was participated in by Messrs. Cooper, Kellogg, Rice, Moore, White and Gumm.

SPEECH FROM A VISITOR.

The President announced that there was in attendance at the session a distinguished visitor from New York City, who had come a long way, in the person of Mr. B. V. Swenson, Secretary and Treasurer of the American Street and Interurban Railway Association.

Mr. Swenson, on being invited to address the convention, talked along the lines of Association work, and urged the members of the Southwestern Association to affiliate more closely with the National organization. He then reviewed the work of the National Association and its auxiliaries which he represents, and the work and function of this newly organized association of electricians. He commended the Southwestern Association for its ability to handle local matters in a way impossible in the general organization.

A TELEGRAM.

The Secretary then read a telegram of regret from Mr. F. E. Scoville, Laredo, Tex., expressing his sorrow at not being able to attend.

INVITATION FOR PLACE TO HOLD NEXT MEETING.

The President then called for invitations for the next meeting of the Association, which was responded to by Messrs. Bonner and Cooper, in favor of Houston, Tex.; Messrs. Duffy and Carroll in favor of Beaumont, Tex.: Mr. Storm for Amarillo; Mr. Edgar for Fort Worth; Mayor Price, for Yoakum. Secretary Stichter read telegrams of invitation from the Mayor of Dallas; also the Commercial Club of that city.

SOME REPORTS.

The Secretary read the report of the Finance Committee, also a preliminary report from the 1908 Question Box. Mr. Head rose to suggest the advisability of a new system for keeping the Association accounts. A motion made by Mr. Cooper that the President appoint a committee to prepare a new system under this head was unanimously adopted. Mr. Moore, of Austin, read the report of the Committee on Thanks, which was unanimously adopted. Mr. Kellogg read the following

REPORT FROM COMMITTEE ON PRESIDENT'S ADDRESS:

To the Southwestern Electrical and Gas Association—Gentlemen: The undersigned committee of five, appointed for the purpose of reporting on the recommendations in the President's address, beg to report to you as follows: We consider the report very creditable to the Association and also to its President, Mr. Edgar, and feel that the Association owes him a debt of gratitude for the care and thoroughness with which the Association's affairs have been handled during the past year under his administration. Briefly, we find that the President recommends the following:

1. That meetings of the Executive Committee be held at least twice a year.

2. That the work of the Secretary, in collecting and classifying data regarding taxes, donations, etc., paid by the member companies, and also that the Secretary arrange in the future to collect and

classify other information of general interest to the members of the Association.

3. That the past records of the Association be printed and sent out to the members.

4. That future conventions always arrange suitable exhibit space to be furnished free for the use of associate members.

5. That an Assistant Secretary be appointed, to be paid by the Secretary, and to maintain an office in Dallas, Tex.

6. That certificates of membership be furnished to the members of the Association, with the request that they be framed and put up in their respective offices.

7. That a committee of four be appointed for the purpose of fostering closer relations with the National and other Associations.

8. That a committee on municipal ownership be appointed.

With all of the above recommendations, your Committee is in hearty accord, and, in order to give an opportunity for the Association in convention assembled to specifically authorize the carrying out of the recommendations above mentioned, we beg to submit the following motions to be acted on in detail by the convention:

Voted, That the Association heartily approves of the work done in the past year by the Secretary in collecting and classifying information regarding taxes, donations, etc., made by the member companies, and desires not only to have this work carried on in the future, but also that other matters which may, in the opinion of the President, be worthy of classification, shall be investigated through the Secretary's office, either by a committee appointed by the Executive Committee of the Association, or by the Secretary direct, and, in order to assist in this work, the President is authorized to appoint an Assistant Secretary, to maintain an office in Dallas, and to be paid by the Secretary of the Association.

Voted, That as soon as the financial condition of the Association shall warrant, the past records of the Association be printed and sent to the members, and also that the records of this convention be printed and sent to the members with the money derived from the programme, as recommended in the President's address.

Voted, That this convention realizes the value and importance of suitable exhibits in connection with conventions, and recommends that in the future free exhibit space be furnished to associate members at all annual conventions.

Voted, That the Secretary be authorized to have printed and delivered to members of the Association certificates of membership, signed by the President and Secretary.

Voted, That the badge used for the convention badge this year be adopted as the standard badge of the Association.

Voted, That a committee of four be appointed by the President to act as a committee on closer relations with the other technical and engineering societies in the country, for the purpose of arranging for interchange of information and co-operation in work between this Association and other allied Associations.

Voted, That a committee of four be appointed by the President to act as a committee on the municipal ownership, said committee during the coming year to investigate the past and present conditions regarding municipal ownership in connection with the members of this Association and report at the next convention.

C. W. Kellogg,
J. A. Myler,
E. L. Wells,
A. E. Judge,
W. F. Altfather,
} Committee.

Routine Business.

It was moved by Mr. Moore, of Austin, that a resolution of thanks be extended to Treasurer Judge, which was unanimously carried.

Mr. Stichter read the Secretary's report, which was received and filed.

Treasurer Judge read a synopsis of the Treasurer's report, which was as follows:

Cash on hand per last report, May 15, 1907.....	$1,148.44
Receipts from all sources to May 9, 1908.....	1,163.00
Total receipts to May 9, 1908.....	$2,311.44
Disbursements to May 9, 1908.....	1,423.58
Balance in treasury May 9, 1908.....	$887.86

Election of Officers.

The report of the Nominating Committee was read by President Edgar, as follows:

We, your committee appointed to select officers for the ensuing year, recommend the following attached list subject to the vote of the Association.

Fred M. Lege, Jr., W. B. Head,
Frank J. Duffy, Thos. Cook.
Sam Kahn,

For President—R. B. Stichter.
For First Vice-President—W. B. Tuttle.
For Second Vice-President—W. B. Head.
For Third Vice-President—Jos. E. Carroll.
For Secretary—J. A. Myler.
For Treasurer—A. E. Judge.
For Executive Committee—H. T. Edgar, H. M. Moore, E. L. Wells, Fred. M. Lege, Jr., A. E. Judge.
For Finance Committee.—Messrs. C. W. Kellogg, Jr., M. A Joy, W. T. Altfather.
For Advisory Committee.—T. C. Brown, J. D. Crerar, L. L. Stephens, H. S. Potter, T. J. Jones, M. M. Phinney, F. E. Scoville, C. V. Peel, F. J. Duffy, E. D. Kelley.

On motion of Mr. Cooper, the Secretary was instructed to cast the unanimous vote for the ticket, which was carried and accordingly done.

The President then vacated the chair in favor of Mr. Stichter. Mr. Stichter made a short speech of thanks and ended by appointing Mr. Kahn, of San Antonio, Editor of the Question Box. Mr. Kahn moved that the Association offer a rising vote of thanks to Mr. Edgar, which was amended by Mr. Cooper, of Galveston, to include three cheers and a tiger, which resolution was voiced with a will. Mr. Edgar having suitably expressed his acknowledgements, the meeting was declared adjourned to meet next year at the place selected by the Executive Committee.

[Official Report.]

PROCEEDINGS, SEVENTH ANNUAL MEETING, WISCONSIN GAS ASSOCIATION.

Held in Milwaukee, Wis., May 14 and 15, 1908.

The convention was called to order in the Hotel Pfister, Milwaukee, Wis., at 11 A.M. of May 14th, by the Vice-President (Mr. Sheldon J. Glass), who assumed the Chair in the absence of President Daniell. The Vice-President having noted the absence of the President, further remarked: I am sure you all regret with me the absence of our President. Perhaps I regret it more than you do. The first thing on the programme is the roll call. Likely it would be better to bring that up at at later time. Next in order of business is the reading of the minutes. As the "Proceedings" of a year ago have been printed the reading thereof will be omitted. I will ask the Secretary to read the

Report from the Committee on Standards.

The Secretary reads as follows:

To the Members, Wisconsin Gas Association:—Subject to a call of the Executive Committee, dated October 31st, 1907, a meeting of the managers of the gas companies in this State was held in the Hotel Pfister, at 2 o'clock, P. M. of Monday, November 4th, the President (Mr. Edward Daniell) presiding. The conference was called for the purpose of discussing standards, and after hearing from Prof. C. F. Burgess, of the Engineering Staff of the Railroad Commission, a committee, composed of R. B. Brown, Milwaukee, J. B. Klump, Janesville, and David Douglas of Eau Claire, was appointed to co-operate with the experts of the Railroad Commission of Wisconsin in determining the standards for gas to be produced. Those present were:

R. B. Brown,	P. M. Gelatt,	W. A. Leuenberger,
H. M. Buck,	S. J. Glass,	J. T. Mason
R. C. Cornish,	Ewald Haase,	F. M. Richards,
John Corscot,	W. E. Haseltine,	P. H. Sawyer,
E. G. Cowdery,	H. M. Humphreys,	B. D. Viles,
Edward Daniell,	Henry H. Hyde,	I. F. Wortendyke,
David Douglas,	F. P. Kelsey,	Robert Young,
R. C. Douglas,	R. P. Kraft.	

Special Meeting, Madison.—Under date of February 24th, 1908, there was sent out a call for a special meeting of the Association, for Monday, March 2d, at 8 P. M., in the Park Hotel, Madison, for the purpose of perfecting plans for appearing before the Railroad Commission of Wisconsin the following day.

The companies represented were:

Appleton, John I. Beggs.
Ashland, M. H. Juhl.
Beloit, B. F. Lyons.
Chippewa Falls, B. D. Viles.
Fond du Lac, N. C. Draper and E. R. Whitcomb.
Eau Claire, David Douglas.
Green Bay, R. M. Howard.
La Crosse, D. G. McMillan and P. M. Gelatt.
Madison, John Corscot, F. M. Richards and Mr. Abell.
Manitowoc, R. C. Douglas.
Milwaukee, S. J. Glass, F. J. Rutledge, E. Haase, R. B. Brown and J. B. Klump.
Oshkosh, Phil. H. Sawyer.
Janesville, I. F. Wortendyke.
Portage, A. S. Quackenbush.
Racine, Henry H. Hyde.
Ripon, W. E. Haseltine.
Sheboygan, Robert Young.
Stoughton, E. A. Beule and George Valentine.
Superior, B. F. Ellison.
Watertown, C. A. Comstock.
Waukesha, H. M. Buck.
Wausau, J. D. Taylor, Jr.

Vice-President Glass presided at the meeting. After a discussion of the topics at hand it was moved by Mr. John Corscot, and seconded by Mr. John I. Beggs, that a committee of five be appointed by the Chair to represent the Wisconsin Gas Association before the Railroad Commission of Wisconsin in reference to standards of heat, light and service to be established. The Chairman thereupon appointed Messrs. David Douglas, R. B. Brown, J. B. Klump, C. H. Williams and Robert Young. In addition, Mr. John I. Beggs was requested to address the Commission in behalf of the gas companies.

The committee composed of Messrs. Brown, Klump and Douglas appointed at the special meeting held in Milwaukee, November 4th, made a verbal report.

Secretary's General Report.

Resolution to American Gas Institute.—Pursuant to the resolution of Mr. R. B. Brown, in relation to calling the attention of the American Gas Institute to the lack of information as to the value of coals and oils for gas making, subsequent to a paper on the subject by Mr. Henry I. Lea, the matter was duly presented to the Institution through its Secretary, and reply was made that it would be brought before the Directory at its next meeting.

Membership.

	Members, May 1st, 1908.		
	Active.	Associate.	Total.
May 1st, 1907.....	93	43	136
Joined 1907 meeting.....	14	7	21
	107	50	157
Resigned 1907 meeting...	6	1	7
	101	49	150

Respectfully submitted, Henry H. Hyde, Secretary.

On motion of Mr. Kimball the reports were accepted and approved.

The report of the Treasurer covering the operation of that office for the year, showed the finances of the Association to be in excellent condition.

On motion the reports were ordered printed in the "Proceedings." The Secretary then read the

Report of Executive Committee.

To the Members of the Wisconsin Gas Association: The following persons have made application for membership in this Association:

Active.

C. A. Comstock, Gen. Mgr., Watertown (Wis.) Gas & Electric Co.
R. M. Howard, Vice-Pres. and Gen. Mgr., Green Bay (Wis.) Gas & Electric Co.
W. H. Hulswit, Manager, Stoughton (Wis.) Light & Fuel Co.
F. E. Keuper, Manager, Citizens Gas Co., Burlington, Wis.
E. E. Mills, Secretary, Citizens Gas Co., Burlington, Wis.
D. G. MacMillan, Pres. and Treas., La Crosse (Wis.) Gas & Electric Co.
D. A. Powell, Chemist, Madison (Wis.) Gas & Electric Co.
B. Hahn, Eng. Div., Milwaukee (Wis.) Gas Light Co.
J. A. Stewart, Com. Mgr., Madison (Wis.) Gas & Electric Co.
J. D. Taylor, Jr., Manager, Wausau (Wis.) Gas Co.
T. B. Wood, Manager, Berlin (Wis.) Gas Co.
C. P. Penniston, Chief Clerk, Kenosha (Wis.) Gas & Electric Co.
R. G. Lowell, Secretary, Oneida Gas Co., Rhinelander, Wis.

Associate.

R. D. Blackmore, Salesman, Milwaukee, Wis.
W. P. Hutchinson, Salesman, Marion, Ia.
A. J. Lindemann, President, Milwaukee, Wis.
G. W. Parker, Sales Agent, New York.
B. H. Spangenberg, Gen. Mgr. and Engr., Rotary Meter Co., New York.
B. G. McNabb, Salesman, Battle Creek, Mich.
A. L. Smyly, Manager, Chicago, Ills.
J. Goldman, Salesman, Chicago, Ills.
T. N. Case, Engineer, Fort Wayne, Ind.

Resignations.

Active.—E. Teitgen, Manitowoc, Wis.; G. G. Michel, Portage, Wis.
Associate.—S. Bent Russell, Louisville, Ky.; E. M. Stokes, Chicago, Ills.

Papers.

The following papers will be presented at the sessions of this convention:

"The Necessity of Proper Maintenance of Meters," by Mr. E. S. Dickey, Baltimore, Md.

"The Tendency of the Times and Its Effect Upon Rates," by Mr. H. L. Doherty, New York city.

"Depreciation," by Mr. Edwin S. Mack, Milwaukee, Wis.

"The Work of Gas Associations," by Mr. L. S. Bigelow, Willimantic, Conn.

Nominating Committee.

The following gentlemen are recommended as the Nominating Committee to select officers for the ensuing year: Messrs. N. C. Draper, Chairman; H. M. Buck and J. D. Taylor, Jr.

Sheldon J. Glass, } Executive
John Corscot, } Committee.

On motion of Mr. Kimball the Report of the Committee was accepted and the Nominating Committee was declared elected, as recommended.

The Chairman—I hope that the gentlemen who have just been elected will feel that they are with us both in person and in spirit and will take an active part in the discussions. If the Nominating Committee can report early this afternoon it will be advisable. The Secretary has a report of the committee appointed to take up the affiliation of this organization with the American Gas Institute, which will now be presented.

Affiliation with American Gas Institute.

To the Members, Wisconsin Gas Association: Your Committee, appointed at the last convention of this Association, to confer with the officers of the American Gas Institute with reference to the affiliation of this Association with the Institute, begs to report that the matter was duly taken up with the result that an agreement has been signed by the officers of the Institute and of this Association, which is as follows:

Affiliation Agreement.—In virtue of an agreement made this 17th day of March, 1908, between the Wisconsin Gas Association and the American Gas Institute, to affiliate under the terms of Section No. 55 of the Constitution of the American Gas Institute, the aforesaid Wisconsin Gas Association agrees from this date to confine its elections to membership to persons directly identified with gas interests within the State of Wisconsin.

The Wisconsin Gas Association further agrees to consult with the Institute before undertaking any original work, and to do each year, in co-operation with the Institute, a certain amount of original work.

The American Gas Institute agrees that the Wisconsin Gas Association shall be entitled to elect one of its members to the Board of Directors of the Institute, the member so elected to be in addition to the 15 members of the Managing Board of the Institute provided for under Section No. 23 of the Constitution.

The American Gas Institute further agrees that should the Board of Directors provide for an Executive Committee, the committee shall include one man from the Wisconsin Gas Association, so long as the number of Associations affiliating under this or similar agreements does not exceed six. Thereafter, there shall be on the Executive Committee at least six men, one from each six affiliated Associations. Should more than six Associations affiliate, the six representatives on

the Executive Committee shall be chosen by the Board of Directors of the Institute in the order of the dates of affiliation, the members first elected by the State or District Associations to be retired after 2 years' service.

This agreement by either party can be terminated on 6 months' notice. (Signed) THE WISCONSIN GAS ASSOCIATION,
By EDWARD DANIELL, President.
HENRY H. HYDE, Secretary.

Agreement authorized by the Wisconsin Gas Association, May 16th, 1907. THE AMERICAN GAS INSTITUTE,
By ALEX. C. HUMPHREYS, President.
JAMES W. DUNBAR, Secretary.

Agreement authorized by the Board of Directors, March 17th, 1908.

The agreement having been executed, we are now at liberty to appoint a member of this Association as Director to serve on the Board of the American Gas Institute.

(Signed) EDWARD G. COWDERY, SHELDON J. GLASS, EDWARD G. PRATT, } Committee.

On motion of Mr. Corscot the action outlined by the Vice-President of the Association was adopted. Vice-President Sheldon then read the following

INAUGURAL ADDRESS:

In the absence of our President, who will not be with us at this session, and as the customary President's address has not not been received from him, it has fallen upon the Vice-President to provide, upon rather short notice, a substitute therefor. The limited time will not permit me to more than outline a few of the thoughts that occur, leaving the more general application of the same to be worked out or developed to meet the ideas or needs of individual cases.

Since our last annual meeting the Legislature of this State has passed the so-called "utilities bill," placing the public service corporations of the State under the jurisdiction of the Railroad Commission. This law, as finally adopted, is considered a model of its kind, and many of its leading features have been copied in the preparation of similar laws in other States.

Naturally the most important question before Wisconsin gas men to-day is the ultimate effect that this law may have upon our industry. Thus far the decisions of the Commission relating to gas companies have been tentative only, and afford no basis from which we may determine what will be the final decisions regarding the rate of return upon investment or the valuation to be placed upon the intangible property of the companies.

The complaint of the Madison *State Journal* against the Madison Gas and Electric Company was one of the first filed under the new law, and the hearings upon the valuation of the property of the Company were held during the months of February and March. The attorneys' arguments in this case will be heard by the Commission the latter part of June, and it will doubtless be some time thereafter before the Commission renders its decision in the case. The Commission seems disposed to get at the actual facts bearing upon each and every factor, and we have no reason to believe that its decisions will in any sense be "unreasonable."

One of the cases now pending before the Supreme Court of this State is that of the Minneapolis, St. Paul and Sault Ste. Marie Railroad Co. (commonly called the "Soo Line") vs. the Railroad Commission of Wisconsin. This case in itself is a trivial one, but the issues are momentous. In September, 1906, the Railroad Commission determined that the Railway Company should stop a local passenger train each way at a point on its road midway between the stations of Nye and Deronda, Polk county. It was not required that a station be established, merely a flag siding without a station agent. The attorney for the Railroad Company contended that the order was unreasonable and confiscatory, that the Railroad Commission had no power to make such an order, and that the making of such an order is prohibited by section 1801 of the laws of 1898. The attorney for the Railroad Company began an action against the Commission to have the order set aside, but the Circuit Court of Dane county confirmed the Commission's order, whereupon the Railway Company carried the matter to the Supreme Court.

When the case was first argued in the Supreme Court, the justices, realizing the great importance of the fundamental questions involved, ordered a rehearing and requested counsel for various railroads of the State to take part and submit answers to the following questions:

1. What is the scope of review by the courts of orders of the Railroad Commission of Wisconsin contemplated in the action provided for by section 16, chapter 362, laws of 1905?

2. Is it within the legislative power to confer upon courts authority to review the reasonableness of rules or orders of the Railroad Commission?

3. What is the true construction of the word "unreasonable" in section 16 of the railroad law?

Counsel representing the railroads and other public utilities of the State have filed their briefs as requested by the court, and the hearings on the same are set for this week. It will be noticed that the third query brings up very clearly the question as to what constitutes unreasonableness as applied either to rates or service. It is possible that the vital point of the constitutionality of the railroad law may be determined by the decision of the Supreme Court in this case.

A meeting of the representatives of the gas companies of the State was called by the Commission in March to consider the question of standards to be adopted by the Commission. Our Association was represented by a competent committee appointed for the purpose. The Commission has not as yet rendered its decision, but we may possibly hear from them upon this question before our adjournment.

The officers of the Association have completed the necessary arrangements for affiliation with the American Gas Institute, as reported by the Executive Committee. This necessitates the appointment of a Director to represent this Association in the board of the Institute. It is to be hoped that great good may come to our members from this affiliation.

It was but a few years ago, comparatively speaking, and well within the memory of many of those present to-day, that the first electric light plant in the United States was installed at Appleton, Wis. At that time it was generally belived that the gas companies would soon be put out of business by the new light. It is needless to say that those expectations have not been realized. To-day there is scarcely a gas company in the State whose business has not increased from 500 to 1,000 per cent. over the volume of business then transacted. For a time the introduction of electric lighting, and also the use of the incandescent gas burner, reduced the volume of gas sales considerably, but this loss has been more than made up by the extensive use of gas for fuel and power purposes, and a much greater use of gas for lighting purposes due to the efficiency and economy of the incandescent gas burner.

Our electric friends have found it impossible to satisfactorily meet the competition from the co-called "Welsbach" burner, notwithstanding the fact that they have brought out many new and improved forms of incandescent lamps, none of which, however, so far as I am able to ascertain, is being pushed to any great extent by the electric companies. While these lamps give a large volume of light with a comparatively small consumption of current, the maintenance of the lamp brings the cost of the service to a point greatly in excess of the cost of an equivalent amount of light from gas sold at prevailing prices.

Experts are constantly working to develop new and more efficient methods of consuming gas both for light and fuel, and unless more economical methods of generating and using electricity can be found, we may reasonably expect the continued prosperity of our companies, but doubtless with somewhat decreased profits, for the tendency of prices charged for gas is downward while the cost of material and labor entering into its manufacture and distribution is constantly increasing. These facts should not be overlooked in any consideration that may be given to a readjustment of selling prices.

In these days the people are inclined too frequently to consider public service corporations from an entirely different standpoint from that applied to other corporations. Personally, I cannot see why our business, when conducted upon the same broad basis adopted by other manufacturing and mercantile institutions, should not be entitled to the same rate of return upon investment and freedom from legislative interference enjoyed by other corporations.

This subject is largely one of education, and if those who take the opposite view are permitted to exploit their ideas without contradiction or answer, we must expect sooner or later that the great majority of thinking people will also adopt that view of the question.

The papers and addresses arranged for this meeting all have a bearing upon the valuation of our properties by the Commission, and it is to be hoped will meet with a hearty and thorough discussion.

Too much credit cannot be given to your Secretary for his energetic work in the preparation of the programme and arrangements for this meeting.

The Secretary—You have heard the very able address of the Vice-President, and as it is a usual thing to refer the address to a committee appointed for that purpose, I should ordinarily move to refer it to such committee, but the modesty of the Vice-President leads him to request me not to do so; as there is nothing in the address that will really require action on the part of a committee, the Vice-President's request will be complied with.

On motion of Mr. Corscot the thanks of the Association were tendered to the Vice-President for his excellent address.

COMMITTEE ON NEXT PLACE OF MEETING.

The Chairman—The Chair will appoint as Committee on Place of Next Meeting, Messrs. B. D. Viles, R. N. Kimball and R. M. Howard. The Secretary wishes me to call your attention particularly to the necessity for letting him know at the earliest possible moment whether you are going to be with us to-night at the banquet. It looks now as if we were to have a much larger attendance than we had originally planned for; as we must inform the Athletic Club just how many to take care of, if you can let the Secretary know between now and 2 o'clock, it will be very much appreciated.

Mr. Corscot—In view of the fact that the Secretary is in search of information which will tend to let the Athletic Club know as to how many people are going to sit down and eat this evening, I suggest we take a recess until 2 o'clock this afternoon, and that immediately after the recess is declared the gentlemen present who feel like putting their feet under the table with us this evening go up to the Secretary's desk and buy their tickets.

The Chairman—If there is no objection that suggestion will be adopted, and we will take a recess until 2 P.M.

The following members were in attendance:

ROLL CALL.

Active.

Beggs, J. I.	Haase, E.	McAdams, B.
Bowen, F. W.	Harmon, H.	MacKay, C.
Brown, R. B.	Haseltine, W. E.	Mainland, S.
Buck, H. M.	Humphreys, H. M.	Mason, J. T.
Callender, D. E.	Hyde, H. H.	Parker, B. L.
Cornish, R. C.	Jones, W.	Pratt, E. G.
Corscot, J.	Kelsey, F. P.	Rutledge, F. J.
Cowdery, E. C.	Kimball, R. N.	Schaper, H. C.
Doherty, H. L.	Kraft, R. P.	Utley, P. L.
Douglas, D.	Larsen, H.	Viles, B. D.
Douglas, R. C.	Leuenberger, W. A.	Walker, J. H.
Draper, N. C.	Lindl,	Wallen, W.
Eastman, J. P.	Lloyd, A. G.	Wilke, A. C.
Eaton, A. B.	Luebkeman, C.	Wortendyke, I. F.
Glass, S. J.	Lyons, B. F.	Young, R.
Gregg, G. F.		

Associate.

Asendorf, C. F.	Kellum, B. J.	Simmons, J. W.
Bredel, F.	Lea, H. I.	Stratton, S. S.
Gourt, A.	Martin, E. B.	Ummach, C. E.
Cressler, G. H.	Parker, J. F.	Wickham, L.
Harr, D. C.	Russell, D. R.	Zwisler, A. L.
Hyde, W. F.	Schall, H. D.	

[To be Continued.]

Carelessness in the Gas Engine Room.

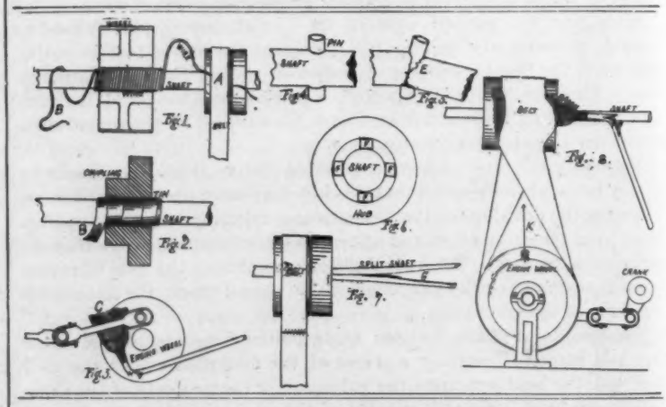
[Prepared for the JOURNAL by ENGINEER.]

Having visited many gas engine rooms I have often seen many indications of careless work, and I herewith give a few sketches, with the necessary explanations. One party who had a first-class gas engine installed in his works found some trouble in getting the drive wheel of the shafting to maintain the proper hold, so that the drive wheel of the engine might work to advantage with a leather belt. Finding that the bore in the hub of the wheel was too large, and in order to make up for this void, and cause the wheel bore to fit snugly on the shaft, he proceeded to wind the shaft, in the locality of the wheel, with wire; then he adjusted the wheel on the wound wire. The set-screws of the wheel hub were turned down through the latter and the coils of wire to the shaft. These held firmly, but in a short time the outer coils commenced to unfurl, and soon the ends projected from beneath the edges of the wheel hub, and it was not long before the snakelike ends of the wire were swaying dangerously to and-fro with every revolution of the shaft. The condition is shown in Fig. 1. At one side the long coil projected, as at *B;* on the other side the coil became entangled under a belt, as at *A*, and the wire was carried around the shaft, in many turns, cutting the belting and narrowly averting a disaster. The wire broke off. Had it not broken when it did the shafting might have suffered.

In another shop where a gas engine was running a similar trouble prevailed with a wheel. This time, instead of filling the void with wire coiling, an attempt was made to make up the deficiency with sheet metal wound about the shaft, as shown in Fig. 2; but as the ends were not properly secured one of them soon worked its way outward, as shown at *B*, and this end proved to be a cutting edge. One day a heavy belt slipped from an adjacent wheel. While running freely on the shaft the edge came into contact with the knife-like edge of the metal and the leather belt was cut off immediately. It is best, of course, to use wheels with the right bore. Clamping wheels can be used, if it is not practicable to put on a common wheel, for almost any kind of a wheel is better than one in which the bore exceeds the size of the shaft.

A manufacturer of gas engines put a certain gas engine in operation in a shoe manufacturing plant. He set up the engine and got it to running well. The very next day a lad employed about the engine room as cleaner, let a broom get caught between the connecting rod and the balance wheel, as at *A*. Of course, the broom was broken into splinters at once. The boy collected all the pieces and removed all evidence. The rod was sprung by the impact. Of course, the builder of the engine was called to account, and he had to substitute the rod with a new one. Some time afterwards, however, the story leaked out.

"Tinkering Toms" prevail in all gas engine rooms and shops. A builder of gas engines tells me that recently a case came up in which



a steel pin worked itself free on the crankpin of the gas engine. Instead of replacing the pin with a little thin bushing, so as to make it grip firmly, the workmen found another pin of larger diameter and undertook to drive it. Fig. 4 shows the normal condition of the pin, and Fig. 5 shows what happened when the over-large steel pin was driven. The shaft was shattered, as at *E*, by the expansion of the pin in the hole. A new shaft had to be sent for and placed in position.

Another case comes to mind in which a gas engine was placed to disadvantage by the formation of a keyed connection with a collar, as displayed in Fig. 6. It seems that the proper sized collar was lost, and rather than delay sending to the maker of the engine for a collar of right diameter, it was decided to use a collar which happened to be at hand. This collar was much to large. In order to overcome the deficiency 4 keys of steel were driven at equal intervals, as shown at *F, F, F, F,* in Fig. 6. As long as these keys were properly balanced in their respective places all went well; but as soon as one of the keys shifted a little the others freed themselves and the whole combination separated. After replacing the combination four or five times it was given up and a new part was ordered from the maker of the engine.

It is a good plan for users of gas engines to keep in touch with the manufacturers of the same. New extra parts ought to be carried. Then, again, some portion of the shafting driven by a gas engine may be put "out-of-whack," as illustrated in Fig. 7. In this case I noticed that one of the extremities of a shaft near a wheel driven by a belt from a gas engine was split. The split portions sagged up-and-down and-in-and-out constantly, and unequal motion was thus imparted to the engine. No engine could run well under such conditions—the

split is marked *G*. I was told that a new section of shaft had been sent for, and until then the gas engine must run on and be subject to the strains and vibrations of the fractured shafting.

A rather odd case occurred not long ago in which someone employed in the gas engine room allowed a broom to go up and over the wheel driven by the main belt and wheel of the gas engine. The condition is shown in Fig. 8. The result of this accident was that the bulk of the broom lifted the heavy belting suddenly and firmly, just far enough in the direction of the arrow *K* to strain the engine balance-wheel journal. The broom passed over and dropped out, but the distorted journal did not drop back in its original position. Naturally the workmen tinkered and adjusted, until finally it was found that the base work of the frame was fractured. This accident made it necessary to remove the entire frame of the engine on that side in order to put in a new side.

Heating a Swimming Pool with Gas.

The last issue of the *Metal Worker* contains the following interesting description of an example of the use of gas water heaters:

In this country the custom of forming organizations so that the members generally may enjoy in common the buildings for social and recreation purposes is confined to no one class. It is a mark of American development that workingmen's clubs have similar equipment to that which may be found in institutions established by men of wealth. While the public bath is an institution described in ancient history, it is only within the last decade that baths and swimming pools for use all the year round have become a part of the equipment of public and private institutions. In earlier periods they were looked upon as too expensive to be considered. The swimming pool which is not only a part of the public baths of large cities and a feature of the equipment of Young Men's Christian Associations in many places, is now not only provided in the larger athletic clubs, but is also looked upon as an important adjunct of leading social clubs. It is quite possible that swimming pools would have been more generally

View in Swimming Pool Room.

used in earlier times had not the expense of heating them, and the equipment to provide the heat in addition to the cost of constructing the pool itself, presented a problem that was rather difficult of solution. There is no question that many have contracted to heat swimming pools who were not conversant with the amount of heat required, and lost money in providing a final satisfactory equipment after making several unsuccessful attempts to provide suitable temperature for the bathing water within the required time.

A very interesting plant for the heating of a swimming pool has been installed in the University Club at Pittsburgh, in the section known as the Schenley Farms, close to the Carnegie Technical Schools, and the library, art schools and museum, and forming a link in the chain which is sometimes called the colony of arts and sciences. The heating equipment is of greater interest from the fact that natural gas is used for the fuel. A picture is given showing the swimming pool and the finish of the apartment in which it is located. The pool is 25 by 50 feet, in size, with an average depth of 5 feet, and when filled contains something over 38,000 gallons. To have heated so large an amount of water would have required an expensive boiler plant, whether steam or hot water heaters had been used for the purpose, and with natural gas available the solution of the problem was relatively simple.

Owing to the availability of natural gas for fuel in Pittsburgh, it was largely used for cooking purposes in the building, and as the cooking was accomplished without that effect on the water back which provided a desired quantity of hot water in the hot water storage tank, the demand grew for a gas water heater, and in Pittsburgh the gas heater has come to a very high state of development. Manufacturers did not stop with providing gas water heaters for family use, but designed them not only for supplying hot water for domestic purposes to apartment buildings and hotels, but also for heating residences by means of hot water radiators. When the heating of the swimming pool of the University Club was taken up, application was made to a company in Pittsburgh, for information and assistance, which finally led to the selection of 4 No. 500 multicoil circulating heaters of a certain type for the work. These heaters were placed in a small chamber provided for the purpose at the deeper end of the swimming pool. Owing to the fact that there was neither coal to be fed to the heaters nor ashes to be removed from them, the small space available for them was all that was required and much less than would have been possible if coal had been used.

The location of the heaters is shown in the accompanying plan and elevation. The heaters are set in pairs, one pair being arranged to take care of each side of the pool. The flow connection from each heater is 2½ inches in diameter, and is connected into a 4½-inch flow main, which runs across the end and along the long side of the swimming pool with four 2-inch connections, the main being reduced from 4½ to 3½ inches after the first connection, to 3 inches after the second connection, and to 2½ inches after the third connection. The circulation is kept up in the pool by means of a 4½-inch return pipe being taken out of the bottom of the pool at the end near the heaters and connecting into two 2½-inch branches, which in turn connect with the heaters. The cold water is admitted to the pool through a 3-inch pipe at the end opposite the heater. The specification required that the temperature of the water in the pool be raised to 85° within 10 hours. A table furnished of the official test shows that the incoming water was at a temperature of 62°, and that at the end of the fifth hour the pool was filled and the water was gradually increasing in temperature. At the end of the eighth hour the temperature at the top of the pool was 86° and at the bottom 82°, the average rise in temperature being 2½° per hour. The record of the test also shows that in the original heating 9,500 cubic feet of natural gas were consumed. At a cost of 25 cents per 1,000 the cost for each complete heating would be $2.40. It is estimated, the company states, that 3,000 cubic feet of gas would be required to maintain a maximum temperature of 85° for 24 hours, or an expense of 75 cents. It is the custom to change the water in the pool three times per week, and on this basis, it is estimated, that the monthly operating expense would be approximately $25.

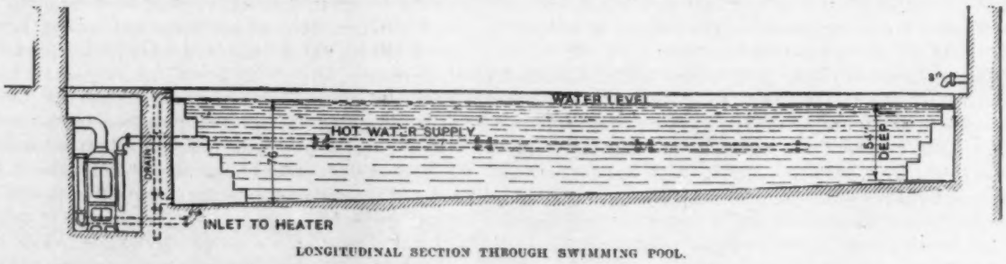
In order to avoid a waste of gas these water heaters are provided with a thermostat, which shuts off the gas supply when the temperature of the water has reached the desired point. Such an arrangement relieves those in charge of the building of any necessity of giving any attention to the gas fires. It has been found in the operation of this swimming pool outfit that the heaters run without any attention except the precaution which is used to see if anything might be needed as the result of some unusual occurrence.

Hourly Temperature in Heating the Swimming Pool.

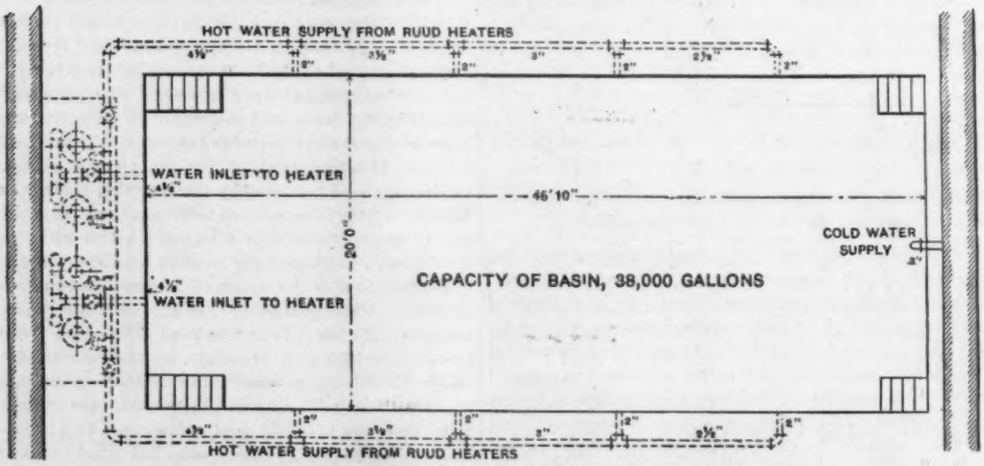
Time.	Room Temperature.	Temperature Incoming Water.	Temperature at Top of Pool.	Temperature at Bottom of Pool.
1 o'clock start.....	..	..	..	..
2 "	70	62	64	63
3 "	70	62	66	64
4 "	70	62	68	65
5 "	70	63	72	69
6 "	71	Pool filled	75	72
7 "	71	..	78	75
8 "	72	..	82	79
9 "	72	..	86	82

Finish, average pool temperature, 84°.
Average temperature rise per hour, 2.75°.

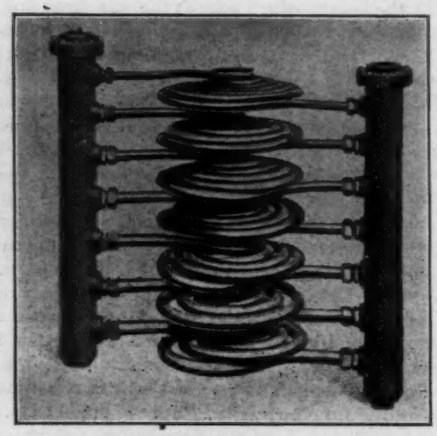
The heating of a swimming pool by means of gas, as explained, arouses interest in the construction of the water heater used, and a reproduction of a view of the coils and their connections with the flow and return headers is given in the accompanying engraving. The heater complete has these coils inclosed in a cast iron jacket, which is lined with non-conducting material, so that the heat result-



LONGITUDINAL SECTION THROUGH SWIMMING POOL.



PLAN OF SWIMMING POOL, SHOWING GAS HEATERS AND WATER PIPING.



Arrangement of Gas Heated Water Coils.

ing from the special multi-Bunsen burners impinges upon the coils with a minimum loss of heat to the chimney. The heaters stand 64 inches high to the top of the dome and 58½ inches to the top of the hot water outlet. The shell inclosing the heating coil is 20½ inches in diameter. Each heater is provided with an 8-inch smoke outlet, the flow and return connections of the heater are 2½ inches in diameter, and the gas inlet to the burner is 1½ inches in diameter. In the No. 500 heater there is one more coil than is shown in the illustration, a total of eight in all. The construction provides that these coils may be readily removed should any occasion require, and connections are made without the use of brazed joints, the screw joint being preferred and being placed outside of the heater, so that the action of the products of combustion cannot affect the thread, is in every respect satisfactory.

Length and Size of Heating Surface in Each Heater.

No. of Coils.	Size of Pipe Diameter.	Length of Pipe.	Total Surface Exposed.
2.....	¾ inch	39 feet	9 square feet
2.....	1 "	35 "	9 "
2.....	1¼ "	29 "	8.5 "
2.....	1½ "	29 "	9.5 "
		132 feet	36 square feet

It will be seen from the second table that each heater exposes a surface in copper piping of 36 square feet, and the four heaters have a total surface of 144 square feet. Each square foot of surface must take care of 38,000 ÷ 144 = 264 gallons of water. As 8 hours sufficed for accomplishing the work it will be seen that the heating was done at the rate of 33 gallons per hour per square foot. Thirty-three gallons of water weigh 275 pounds. Possibly the greatest work that will ever be required of the heater would be when the winter is severely cold when the water supplied to the heaters would be as low as 46° instead of 62, as in the test reported. When the water would be at as low a temperature as 46, it would be necessary to raise it about 40° to reach 86°, or the 275 pounds of water, which must be warmed by each square foot of surface per hour would require a total of 275 × 40 = 11,000 heat units to be transmitted per square foot per hour.

A little calculation here shows that the transmission of heat from the hot gases surrounding the coils through the copper piping to the water flowing through these pipes is not even approximately near the limit, but rather well within the capabilities. Engineering tables show that the transmission of heat through copper pipe is a given number of heat units for each degree difference between the temperature of the heating medium and the temperature of the heated medium. The average temperature of the water can be taken for the purpose of an approximate calculation at 65°.

Some admixture of cool air must take place in the gases, which at the burners at the point of combustion might be considerably above 1,000°, so that the temperature of the gases striking the first copper coil might not be higher than 500°, while that at the outlet to the smoke pipe might not be in this instance much over 150°. Striking an average between these two temperatures we have the coils surrounded by gases at an average temperature of 325°. Subtracting the mean temperature of the water from the mean temperature of the gases gives a difference of 260°. Dividing this into the 11,000 heat units gives so low a rate of heat transmission per square foot of surface per degree difference that the heaters appear well capable of the work they have been installed to do and explains why the work which the specifications required to be accomplished in 10 hours was readily accomplished in 8 hours. It also seems to support the claim of the company of an efficiency of 85 per cent. for the heaters.

It will be noted that the construction of the heater places the larger two coils of 1¼-inch pipe at the bottom of the heater where the temperature of the gases is the highest. Immediately above the diameter of each of the two coils is reduced to 1½ inch so as to retard the flow of water relatively, and being in gases of somewhat lower temperature to insure its heating to practically the same temperature as the lower coil. The diameter of the coils is reduced to 1 inch and to ¾ inch, as the top of the heater is approached, and the temperature of the

gases surrounding them is reduced, so that it is possible that the temperature of the water flowing through the top coil may be very nearly the same temperature as that coming through the larger coil at the bottom, even though there is considerable difference in the temperature of the gases surrounding the different coils.

Measurement of Light and Illumination.

In connection with the Municipal, Building and Public Health Exhibition, held at the Agricultural Hall, London, last month, Mr. J. S. Dow, delivered a short lecture, illustrated by numerous specimens of apparatus and lantern slides, on "The Measurement of Light and Illumination." He said that so long as we were comparing light of nearly the same color the disk photometer answered fairly well, but when we came to the measurement of colored lights, such as that of the flame arc, something different had to be employed, if accurate readings were to be obtained. To meet this case various types of flicker photometers had been introduced, such as the Simmance-Abady, the Krüss, the Wild and the Beckstein. Referring to units of light, he said that the candle was found to be a very unsatisfactory unit, as there was no uniform method of making candles. Hitherto each country had had its own unit. England, Germany, France and the United States had all different ideas as to what a candle was. The German candle was not the same as the English candle, and the consequence was that when electric lamps were sent over here marked so many candles one could not be certain what was really meant. Now, however, the several countries were coming together on this point, and by means of the interchange of seasoned electric glow lamps among the several national laboratories it was hoped that an international unit of light would be arrived at. Then there was the measurement of the mean spherical illuminating power of any particular lamp. This could now be done very easily and rapidly by means of the globe photometer. This was a large globe with a white interior surface. The lamp to be tested was placed in this globe, with a screen to cut off the direct rays of the lamp from the photometer, so that it was only the reflected light from all parts of the interior of the globe that reached the photometer, through a suitable window in the globe.

Whatever the illuminating power of any particular lamp was, the illumination which the user got from it depended very largely upon what he (the user) did with the lamp. After all, what the user was concerned with was the illumination he obtained. There were numerous instruments for measuring illumination which gave very satisfactory results, but better results were, he thought, yet to be obtained. He thought the day would come when we could take our illumination photometer into a railway carriage with us, and ascertain whether the illumination was up to the proper standard. We would also have public lighting contracts specifying a certain minimum illumination. There would be periodical testing of the illumination, and if it was found not up to the standard specified in the contract, then a complaint could be lodged against the supply company. He had not the least doubt that this would be the method of the future. We would have the illumination of our streets tested by competent experts in the same way as now we had the drains tested. Of course, there must ever be competition between the different sorrces of light, but the measurement of illumination was a different matter—that did not depend upon the kind of light used.

On motion of Mr. Leon Gaster a vote of thanks was tendered to the lecturer, the proposer remarking that what they wished to do was to educate the public to have light, and just the proper quantity of it, exactly where it was wanted. If this could be accomplished, a large part of the $200,000,000 spent annually in lighting in England would be saved.

Afterwards a demonstration was given in the methods of measuring illumination.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, May 9th, 1908.

Coalexld.—The Draycott Gas Company.—Further Advance in High Power Lighting.—The Demand for Coke.

A new process, bearing the title of "Coalexld," invented and patented by Mr. James Jowett, of Bolton-le-Sands, is being introduced to the notice of gas engineers, and proceeds on lines that have hitherto received very little attention. It requires no structural alteration and no special apparatus, as it consists of a simple and inexpensive method of watering the coal, before use in the ordinary way, with a solution containing about 2 pounds or so of certain soluble salts, costing about a shilling. There is the important advantage that a practical trial can be made for a matter of shillings only, so there is nothing to lose if the results claimed are not realized. One or two reliable men in the gas world, however, have tried the process and are prepared to indorse the claims of the inventor. I believe that there is a process in use in connection with coke ovens, in which a small quantity of salt is mixed with the coal in order to render the resulting coke free from arsenic, but do not remember any other case of doctoring the coal for gas making than the Cooper liming process, which was introduced some 25 years ago, and attained a certain reputation at Tunbridge Wells and elsewhere. It consisted of mixing about ½ cwt. of lime with each ton of coal before putting into the retort. One disadvantage with insoluble ingredients is that the expense of intimate incorporation or admixture, as applied to some hundreds of tons of coal per diem, is by no means an inconsiderable item. But the soluble materials used in the Jowett process are not only cheap as regards cost, but also as regards application. It is a very inexpensive matter to dissolve up 2 pounds weight of salts in a gallon or two of water, and to distribute the same over the coal as laid out for charging into the retort. For an average quality coal the mixture consists of 14 ounces potassium chloride, 6 ounces potassium nitrate and ¼ ounce potassium permanganate. The lowest quality coal tried by the inventor required a more liberal dose, viz., 24 ounces, 12 ounces, and ½ ounce of the respective ingredients.

The object in view is to produce a solid residual that shall be equal to "Coalite" or "Carbs" without reducing the distillation temperature or otherwise affecting the ordinary working results. And it is claimed that the process does not affect the quality of the gas nor is it in any way prejudicial to the fireclay retort. One would like to know a little about the chemical reactions involved and the train of experiment or of reasoning which led the inventor to adopt the chemicals above named and the various proportions. As applied to second rate gas coals, it would appear that his ideas run in the direction of 56 to 96 parts chlorate, 24 to 48 nitrate and 1 to 3 of permanganate, the relative proportion of the last two named ingredients being increased, and that the total proportion shall range from 20 to 40 ounces per ton of coal. The largest quantity named is not as much as ⅛ per cent. by weight, and it is surprising that such a small proportion should be capable of exercising any marked effect on the whole bulk of the coke. As regards the quality of the gas, one is reminded of the story about Macready. The eminent tragedian was offered a dram of whisky contained in a glass of extremely liliputian dimensions, with this hospitable remark: "Take this, it will not hurt you," and he replied, with a significant glance that took in the small extent of the dose, "No; it would not if it was vitriol." All the salts named evolve oxygen when heated, and this, if it did not combine with carbon to form carbonic oxide, would go forward and be absorbed in the oxide purifiers, and the property of evolving oxygen may possibly be concerned in the invention.

It is claimed that the resulting coke is in every way entitled to an equal place as a household fuel, with the other products named, and that it is free from the prevalent objections to ordinary retort coke, and to be free burning in any ordinary grate, free from sulphur, excelling ordinary coke or coal as regards heating value, yielding a clear, bright fire, and a small percentage of ash. The idea is, probably, that the proportion of radiant heat is increased, seeing that so small a quantity of chemicals cannot add materially to the actual number of heat units evolved by the combustion. Only a short time back I was remarking, in view of the increased demand for a smokeless fuel, that the lines on which to work were the improvement of the coke without at the same time prejudicing the yield on the quality of the gas. As the patentee offers to supply the mixture ready for use it may be expected that a considerable number of gas engineers will lose no time in making a test of its merits, and that there will be more to say about it in my next letter. It is certainly a new departure and may upon further investigation lead to interesting and useful results.

Last month I alluded at some length to the extraordinary position of gas affairs at Draycott, which had led to the promotion of a bill by the Draycott Gas Company before Parliament. At a recent meeting of the shareholders the action taken by the directors was unanimously approved. It was stated that the attempts to take away the business had on the whole been unsuccessful, and that in the event of the bill becoming law, as there was every reason to suppose would happen in regular course, the Long Eaton Gas Company would be compelled to

take up and remove, within 3 months, all mains, pipes and apparatus, belonging to them that had been put down in the area concerned. Until a very recent date, it had been supposed that the Long Eaton Company would never require to exercise the powers they possessed in the Draycott district, and for that reason there was no apparent necessity for taking steps to repeal such powers. The chairman also remarked that the Company had never at any time raised or increased the price of gas, which showed that the consumers had always received every possible consideration. So the extraordinary and exceptional position at Draycott appears to be drawing towards a satisfactory conclusion.

Of all the improvements that have taken place within the last 25 years, the increased duty obtainable from coal gas is not the least remarkable. Many of us can remember when the Sugg argand, developing some 3½ candles per candle foot per hour, was hailed as a decided improvement. The earliest forms of incandescent burner claimed 12 to 15 candles per foot. But the latest development, the Keith and Blackman burner, worked with compressed air, claims to produce no less than 60-candle power with London gas, or over 70 candles with the richer gas supplied in Edinburgh. As much as 1,500-candle power can be obtained from one mantle of quite ordinary dimensions, which is quite sufficient to compete successfully with flame, electric arcs and other modern improvements. The burner, requiring a supply of compressed air, is not available for ordinary consumption. But it furnishes a valuable object lesson as to the quantity of inherent light energy that is contained in coal gas, and leads one to wonder whether the maximum limit indicated by theory will ever be realized in practice, and if so, what is the definition of that limit. As compared with the 20 to 25-candle duty that is at present obtained from the best forms of natural burners, *i. e.*, burners not fed with compressed air, there is evidently an enormous field for advancement. The only objection is that incandescent gas light is already so cheap that further improvement does not seem to be called for. But there is, in connection with street lighting, railway station lighting and such like, a large demand for light centers of 1,000 to 2,000-candle power, and any feasible plan for supplying this want in a cheap and reliable manner, by means of coal gas, is sure to meet with a large amount of support. A light of 1,500-candle power from one single mantle represents an enormous advance on the large and unwieldy cluster of flat flame or argand burners that would be required to produce an equal lighting value.

There will be no cheap coke to be had this summer. Parties who are accustomed to come round and buy up their year's supply at a low figure, from what is usually termed surplus stock, are likely to be disappointed. The run upon coke throughout the country has been unusually keen, and many gas works have been declining new business, for the reason that the coke yard is clear every day. We are accustomed to talk of reducing to summer prices at this period of the year, but in more than one instance the price was actually advanced on the 1st inst. The weather has certainly been favorable to the consumption of fuel during the last 8 or 9 months, but that is not sufficient to account for it. We have had a long, cold springtime before. I think the explanation of the matter is that the public are appreciating the value of a smokeless and sootless fuel. Coke is certainly used to an increasing extent for technical purposes. Bakers have generally adopted an improved form of oven for baking bread, in connection with which the use of coke is especially recommended. It is found that coke, either by itself or mixed with cheap small coal, is very suitable for raising steam. At a recent meeting of the Ryde Town Council it was stated by the engineer that the cost of fuel, per million gallons of water pumped at the water works was £3 7s. 11d. when coal alone was used, and £2 16s. 7d. with a mixture of coke and coal a saving of 11s. 4d. or about 20 per cent. These figures were based on the actual working returns over a period of 10 months. But the increased demand for coke is quite as marked in residential as in factory districts, showing that the ordinary householder, as well as the manufacturer, is appreciating coke as a fuel for domestic purposes, especially for kitchens and close stoves. It is also used to a considerable extent in admixture with small coal, for open fires. Possibly there is something in the suggestion that the public resent the recent advances in the price of coal, and are glad to restrict their consumption, even if it entails some personal inconvenience. It is certain that when the price of any commodity is raised, the consumption is decreased, even with regard to necessities of life. If the price is objected to, there is a greater degree of attention bestowed in the direction of cutting off all waste or excess, or of turning off towards any promising substitute. But I am sanguine enough to believe that the improved demand for coke rests upon a more substantial and permanent basis, and that gas engineers will be well advised in encouraging the sales of this residual by every possible means.

Items of Interest
FROM VARIOUS LOCALITIES.

At the annual meeting of the proprietors of the Perth Amboy (N.J.) Gas Light Company the following officers were re-elected: President, P. Convery; Vice-President, W. H. McCormick; Secretary and Treasurer, A. F. Reitmeyer.

Advices from Los Angeles, Cal., under date of May 15th, are to this effect: "The Peoples Gas and Coke Company and the Lowe Manufacturing Company, both of which concerns were started by Prof. T. S. C. Lowe, were sold under the hammer at the Court House, this morning. The purchaser was Mr. G. H. Hayes, a prominent miner in the Goldfield district, who is now the President of the named Companies, and who bought them in presumably for the interest now in control of the specified properties. His bid was $5,000. The properties were sold to satisfy a judgment amounting to $24,000, held by Mr. J. S. Dilheimer, representing material furnished by him. Last week, under the same judgment, the personal property and a portion of the stock was sold to Mr. Hayes for $5,010. The sole control of the concerns is at present, therefore, nominally vested in him."

At a special meeting of the shareholders in the Calumet (Mich.) Gas Company, held last Friday, the Directors were empowered to take the steps necessary to issue a bonded indebtedness, the proceeds to be devoted to such purposes as in their judgment would conduce to the benefit of the Company.

The Sawtelle Commercial Club, of Sawtelle, Cal., are agitating the matter of the construction of a gas plant for that place. A petition is being circulated to sound the sentiment of the residents over the project, and the Club has declared that if 400 names are put to the petition the gas works will be constructed this summer.

Mr. J. Arnold Norcross, Secretary-Treasurer of the New Haven (Conn.) Gas Light Company, recently forwarded to the New Haven Board of Police Commissioners a check for $100, with a letter explaining why such action was taken, a paragraph of which contained these lines: "During 1907 these robberies (prepayment meter) greatly increased in number, causing loss of money to the public and much damage to the property of the Company. By the good work and vigilance of the police these crimes are now comparatively infrequent and the situation is under control." The donation, it might be added, is intended for the treasury of the New Haven Police Mutual Association.

At the annual meeting of the Western Gas Construction Company the following officers were elected: Directors, O. N. Guldlin, Charles McCulloch, S. M. Foster, O. O. Thwing and J. R. McCulloch; President, O. M. Guldlin; Vice-President, S. M. Foster; Treasurer, J. Ross McCulloch; Secretary, Charles McCulloch; Chief Engineer, O. O. Thwing; Assistant Secretary, C. S. Printz.

The curb market, especially in respect of Bay State Gas Company's shares, seems to be rapidly extending. At any rate a chap named H. J. Gardiner was arrested some days ago by the police of Providence, R. I., charged with the larceny of 13,200 shares of Bay State gas from the brokerage office of Patton & Driver, of Boston. Just before his arrest Gardiner had thrown a few hundred shares of the stock in a Providence street gutter—curb-and-gutter market we should have said at the outset.

The Glens Falls (N. Y.) Gas and Electric Company has notified the residents of that city that its minimum charge per month—or readiness-to-serve charge—has been reduced to 50 cents per month, the change to become operative July 1st. The current charge is $1 per month.

In the ascension made at North Adams, Mass., on the 22d of May, by the balloon "North Adams, No. 1," the pilot (Prof. Leo Stevens) was accompanied by Mr. and Mrs. E. C. Peebles. The latter was formerly Superintendent of the North Adams Gas Light Company, and Mrs. Peebles was the first of the women of North Adams to "Go up in a balloon."

THE Consolidated Gas, Electric Light and Power Company, of Baltimore, has an option to purchase 55,000 square feet of land on East Monument street.

THE Chelsea (Mass.) Gas Light Company is comfortably doing business in its temporary offices, No. 386 Broadway. If the officials and the Company's customers are so pleased over their temporary quarters, what will be their speech when the quarters now under arrangement, and intended to be permanent, are completed?

A CORRESPONDENT in Shelbyville, Ind., writing under date of the 19th May, says: "The Shelbyville Gas Company, which was purchased some time ago by Chicago capitalists, is being completely overhauled. The main items in the reconstruction are a new storage holder, up to retaining 75,000 cubic feet, new purifiers, 10 feet by 12 feet by 5 feet, new scrubbers and condensers, and a new steaming outfit. The holder material is now on the ground, and the contract complete has been awarded to the Stacey Manufacturing Company, of Cincinnati. In addition to the work in the plant proper, the Company will replace several stretches of old mains with new ones, and it is planning to pipe all the streets in the residence sections of the city, several important ones of which have sprung up since 1906. Mr. E. A. Potter, of Chicago, who is the President of the Company, is also its General Manager. Mr. G. M. Geddes, who was for a number of years Superintendent of the Mattoon (Ills.) Gas Light and Coke Company, has been appointed Superintendent of the Shelbyville Company, and is now in actual charge of the works. Mr. G. H. Dunn, who for 20 years was President of the old Shelbyville Company, has retained his interest under the present ownership, and naturally is a very important figure in helping to promote the trading in artificial gas in this healthily advancing city."

MR. F. R. HUTCHINSON, whose clever services in connection with the New Business Department of the Public Service Corporation, of New Jersey, and prior thereto with the Camden (N. J.) Gas Company, has been engaged by the Albany Foundry Company to represent it in the States of New Jersey, Pennsylvania, Virginia and West Virginia. Mr. Hutchinson is a clever, capable gentleman, and if good wishes will be of real avail to him he certainly will be well attested.

"T. W.," writing to us from Washington, D. C., under date of 25th ult., says: "The Board of Commissioners for the District of Columbia forwarded some days ago to the District Committee of the House of Representatives a report on the bill proposing to amend the Act of 1895, regulating the sale of gas in the District of Columbia, by substituting the Steward slit-union burner for the Bray slit-union burner in the official testings for candle power. The Commission makes the somewhat confusing report that while the Steward burner is a fit burner for the use of consumer, it is nevertheless not altogether suited for use in making official tests for candle power."

MR. CLARENCE KING, who represents a syndicate of Philadelphia capitalists, announces that his parties have secured much more than a controlling interest in the Consumers Gas Company, of Atlantic City, N. J., and that the Board of Directors will be reorganized the 16th inst. It is understood that Commodore Louis Kuehle will be retained as President, and that J. Reed will continue as Solicitor. The position of Treasurer and General Manager is, as we understand it, to go to Mr. F. B. Aldrich, of Pottsville, Pa.

THE Coast Gas Company, of Belmar, N. J., has secured control of the plant at Lakewood, N. J., and it is understood that a high pressure line will be laid from Manasquan to Lakewood, and that the works at the latter place will be shut down.

ENGINEER-IN-CHIEF A. H. BARRET, of the Louisville (Ky.) Gas Company, has planned a piping campaign for the present summer, which prescribes the placing of not far from 10 miles of 6-inch and 4-inch pipe to and through residential districts that have developed greatly in the suburbs within the last 2 or 3 years. Mr. Barret declares that the increase in gas sendout rather more than keeps pace with the increased demand for electrical current—the Louisville Gas Company is in control of both systems. President Sackett is providing the funds for extensions and betterments without seeming difficulty, and, in fact, is actually a President instead of being so nominally only.

MR. L. B. WATROUS incloses the following, from Haverhill, Mass., under date of the 20th inst.: "Mr. George B. Mansur, of Haverhill, delivered an unusually interesting lecture and demonstration before the Eastern Association of Physical Teachers at their 50th meeting in Pierce Hall, Engineering Building, Harvard University, Cambridge, one evening last week. His subject was an 'Explanation and Demonstration of the Four-Cycle Gas Engine,' and the manner in which he treated his theme was well shown in the rounds of applause awarded him by a large and comprehending audience."

LAST month Mr. H. H. Carr, General Manager of the Raleigh (N.C.) Electric Company, was appointed by the United States Circuit, Receiver of the Fayetteville (N. C.) Gas and Electric Company. The active mover in the proceedings was the American Security and Trust Company, of New York.

"B. D. M., writing from Grand Rapids, Mich., says: "Although it may seem a trifle out of date, for the 'opening' occurred May 16th last, but on the theory that 'tis better than never,' here goes for a short mention of the matter: The Grand Rapids Gas Light Company having finished equipment of the rest room for its women employees, an evening was set apart for its formal opening. The occasion was also taken advantage of to give a 'farewell shower reception' to Miss Henrietta Schadellee, the Company's addressograph clerk, who leaves shortly for quite a trip through Europe. The affair was informal, and in the 'shower' the voyager to be was presented with a traveling bag, umbrella and one or two other 'drops.' The room is on the second floor of the office building of the Company, and its pretty decorations and ample wardrobes, etc., are fittingly supplemented with lounges, tables, chairs (easy and rigid) and a gas range. Many of the women folks take their luncheons downtown, and in this rest room they have every facility for co-operative service and cooking. The room is provided with the current periodicals, the local papers, etc., and will be at the disposal of the women folks any hour in the day, and it will also be the headquarters for social gatherings at appointed times."

THE Union Gas and Electric Company's reorganization at Bloomington, Ills., resulted as follows: President, Richard S. Storrs; Vice-President, G. Bullock; Secretary-Treasurer, L. B. Johns; Directors, R. S. Storrs, G. Bullock, L. B. Johns, J. T. Lillard and E. E. Witherby. Mr. W. F. Clausen will remain as Superintendent, and Mr. L. B. Johns is to have charge of the new business section. Many improvements will be made on the works proper later on, but the first important step in the betterment plan will be a sensible extension of the main system.

LATE last month the Grand Rapids (Mich.) Gas Light Company paid those employees a 17th consecutive semi-annual dividend who have been in its service for 18 consecutive months.

NOW we have the record of the resignation of W. W. Gibbs from the Board of Directors of the Welsbach Company. His successor is M. M. L. Clothier, who also succeeded Mr. Gibbs on the latter's resignation from the directorate of the U. G. I. Company.

THE regular semi-annual dividend of the American Gas Company, amounting to 3 per cent. on its capital stock, has been declared. It is payable the 10th inst.

THE by-laws of the Macomb (Ills.) Light and Gas Company have been amended by an order reducing the number of Directors from seven to five.

ON and after the 1st prox., the net rate for gas in Houston (Tex.), will be $1.15 per 1,000 cubic feet. If bills are not paid by the 10th of the month the Company may charge $1.25. Manager Dunbar is quite a diplomat.

"B. J. M.," forwards the following from Racine, Wis., under date of the 20th ult.: "City Attorney Burgess has made a complaint against the Racine Gas Light Company to the Railway Commission of Wisconsin in behalf of the city of Racine. It is alleged that two rates are charged by the Company, the rate for lighting purposes being $1.40 gross and $1.20 net per 1,000 cubic feet; the rate for fuel purposes being $1.20 gross and $1 net per 1,000 cubic feet. It is set forth that the rate charged at La Crosse is only $1 per 1,000 cubic feet, notwithstanding the shipping facilities are better than in Racine, and complaints are made that the rate in Racine is too high; also, that two meters are used in this city; and from a test recently made it was found that 75 per cent. of the meters tested were running too fast. The complaint asks: First, to lower the rates charged for gas in the city of Racine; second, to furnish meters which will register accurately the amount of gas consumed; third, to charge but one rate for gas consumed, whether it be for fuel or lighting purposes." Well, well; 75 per cent. too fast! And why only 75 per cent.?

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand anytime of Wednesday.

MONDAY, JUNE 1, 1908.

The Market for Gas Securities.

The general market ran off quite sharply early in the week and Consolidated went with it. The bid price at noon to-day (Thursday) was 124¼, holders asking 125. There has been quite some good buying of Consolidated in the week.

Brooklyn Union is 110 bid, and people close to those who have knowledge of its treasury conditions are advising its purchase. Peoples, of Chicago, is 1½ points off, whereas every fact connected with its operations would point to a figure for it of not less than 125. It is undeniable that the inquiry for gas bonds is quite persistent.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 1.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid*	*Asked.*
Consolidated	$78,177,000	100	124¼	125
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual	3,500,000	100	130	160
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	92	96
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	110	120
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	250,000	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1	1 1-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	2,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric				
Co.	20,500,000	100	89	89½
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	87	88
Preferred	3,036,500	100	81	84
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co.,				
Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Lt. Co.,				
1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,322,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	—	100
Preferred	2,500,000	100	60	70
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	106½
" 6 per cent. scrip,				
due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	55	55¼
Preferred	25,000,000	100	84¾	85
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	127	128
New Haven	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	90¾	91¼
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Elec. Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¼	105½
San Francisco, Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	93¾	—
Syracuse, N. Y.	1,378,000	100	50	55
Bonds	2,047,000	1,000	103	—
Washington, D. C.	2,600,000	20	346¼	353
1st Mortgage, 6's	600,000	—	—	—
Western, Milwaukee	4,000,000	—	—	—
Wilmington, Del.	600,000	50	230	—

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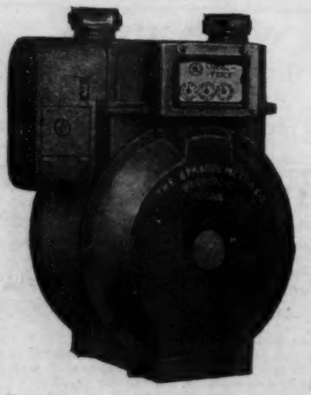

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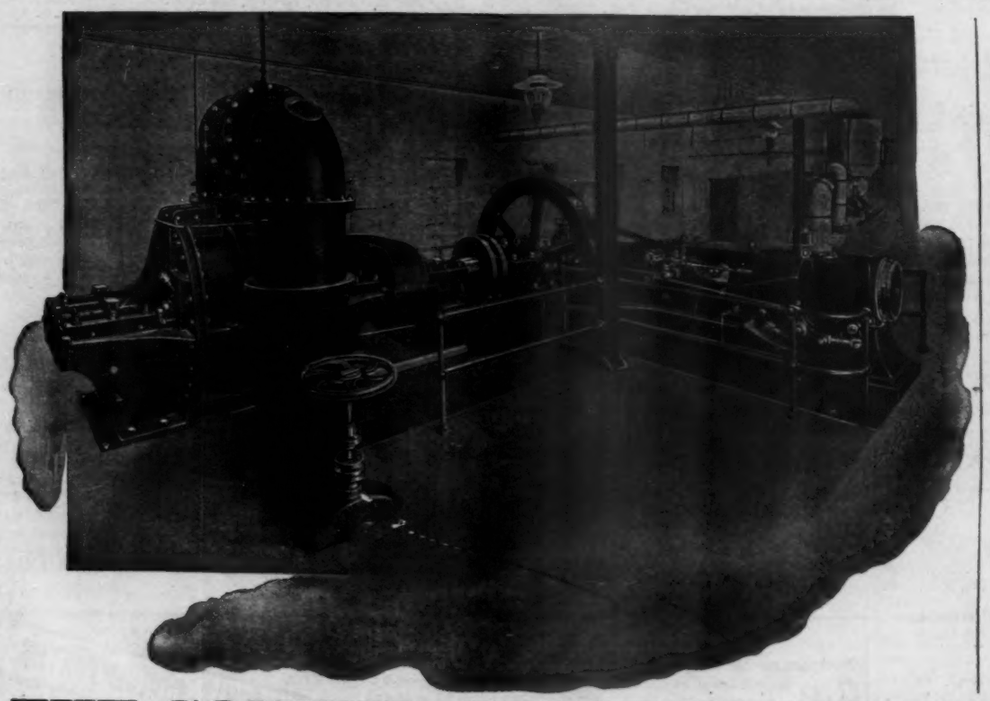

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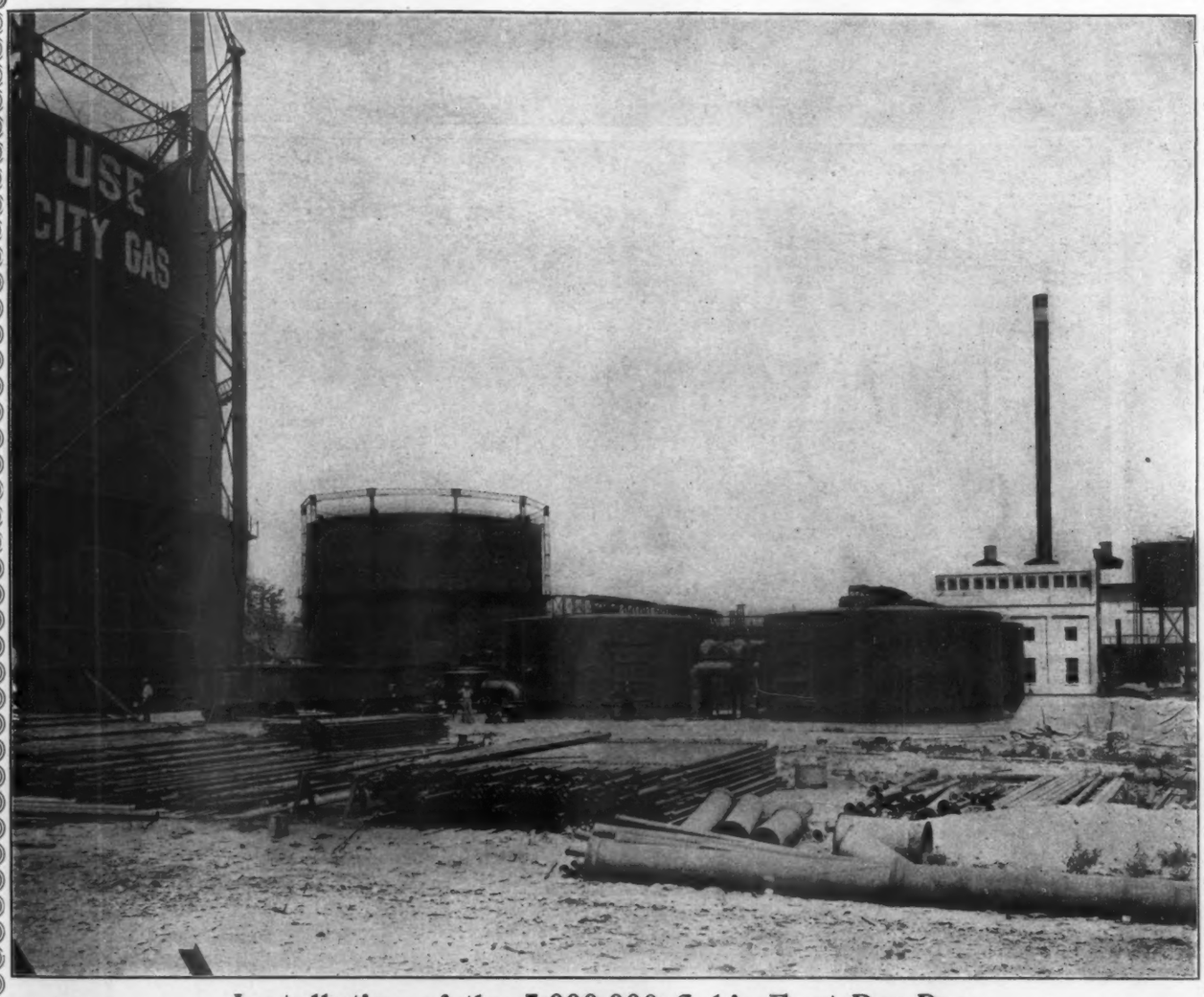

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We have Recently Contracted with the ILLINOIS STEEL COMPANY
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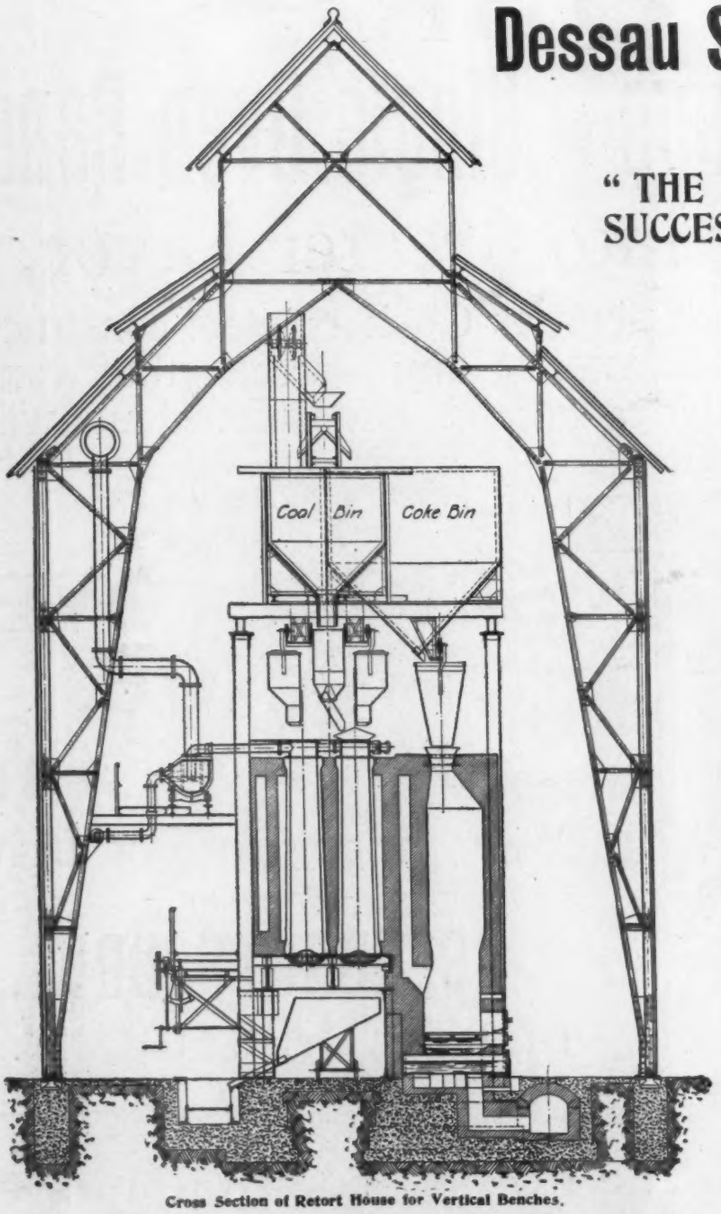

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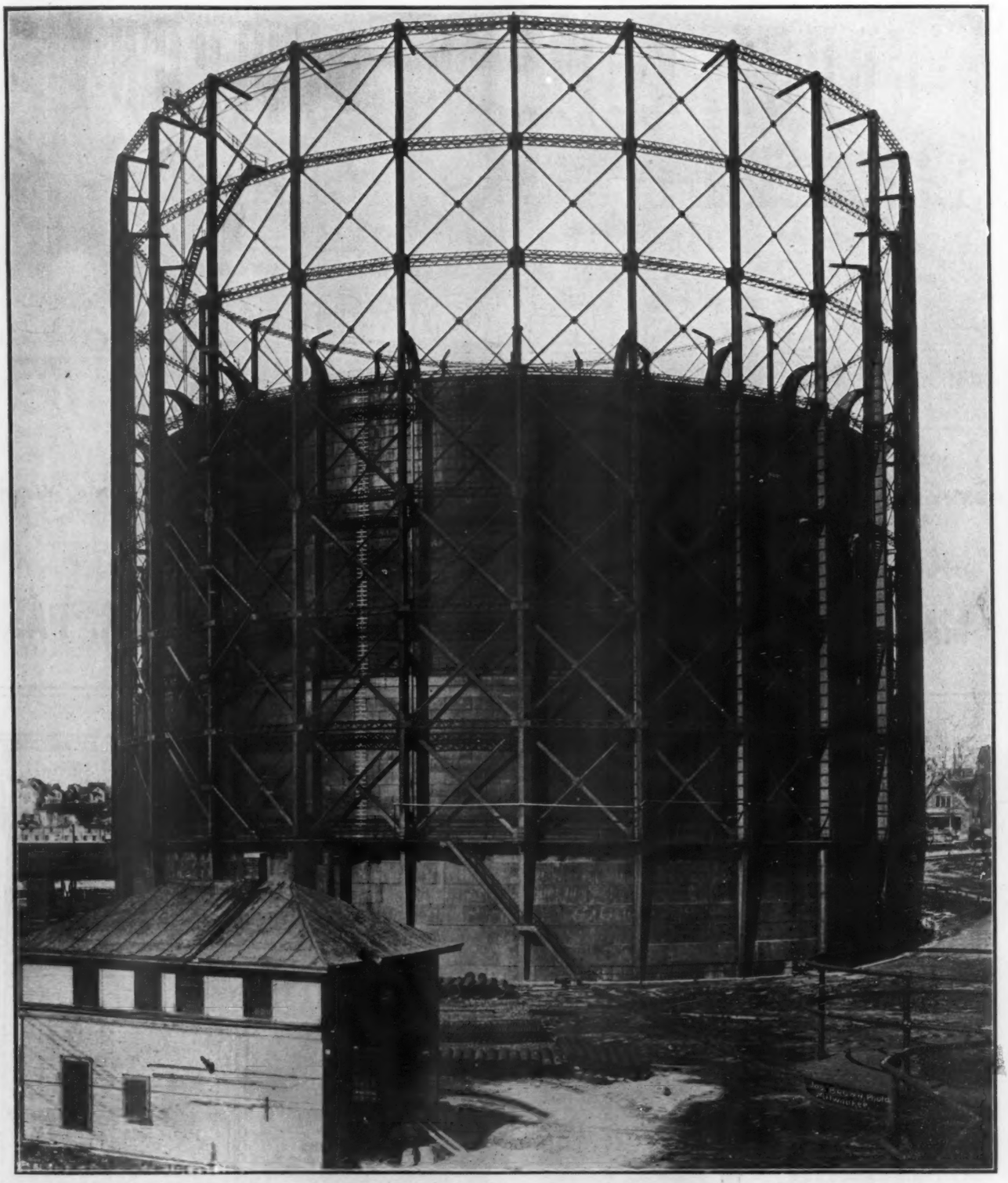

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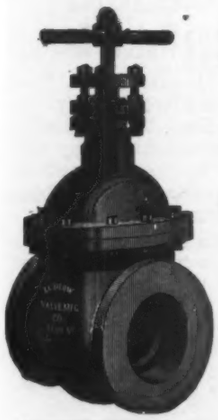

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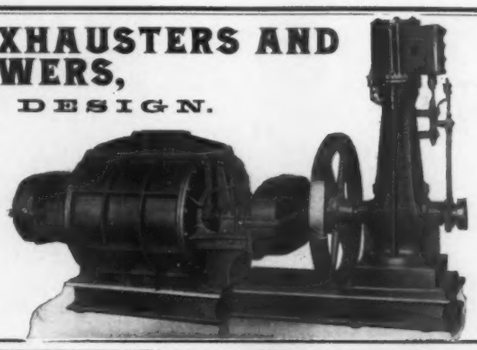

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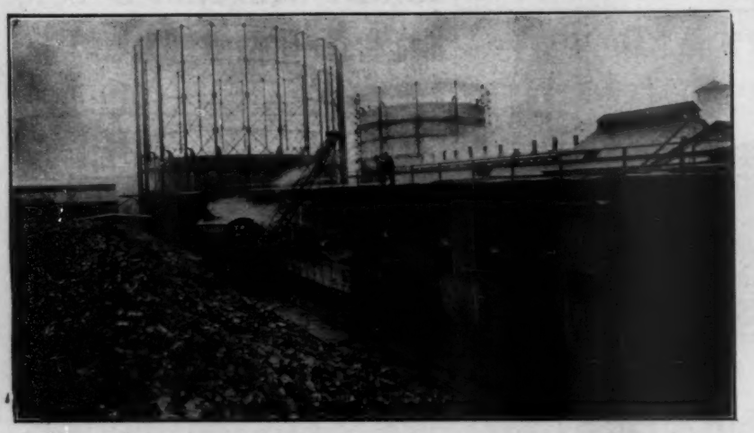

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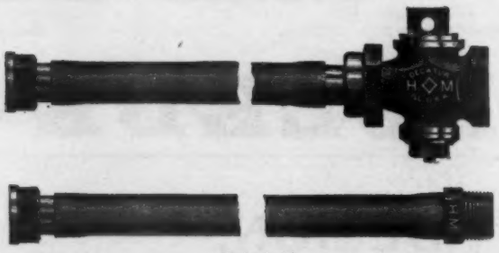

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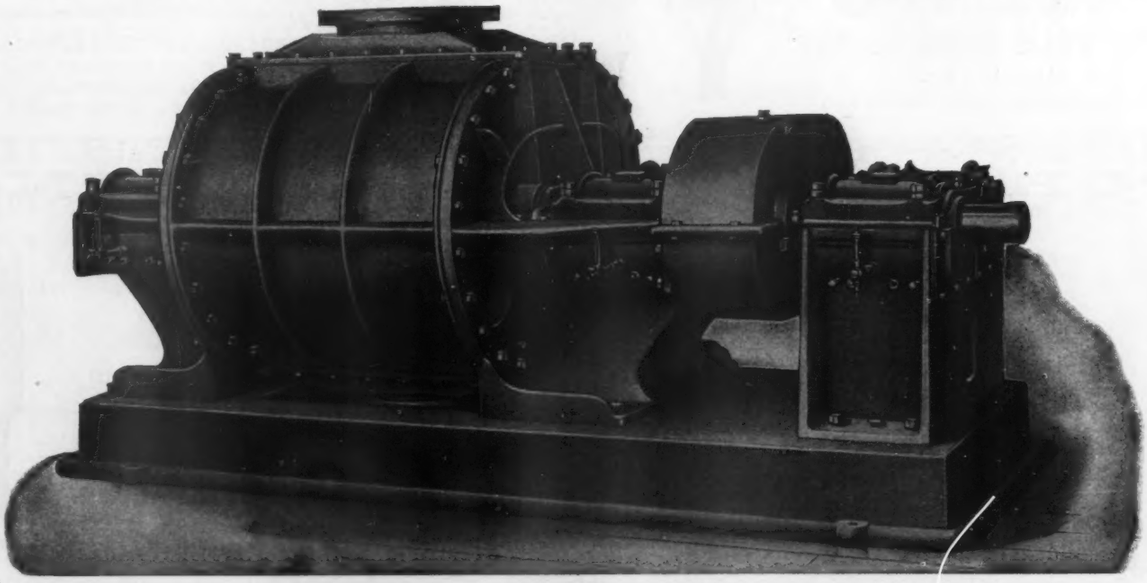

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PUBLIC LIGHTING TABLE.

JUNE, 1908.

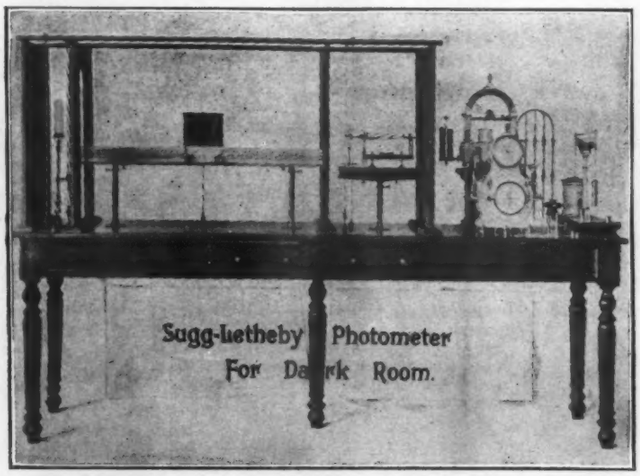
Table No. 1.
FOLLOWING THE MOON.

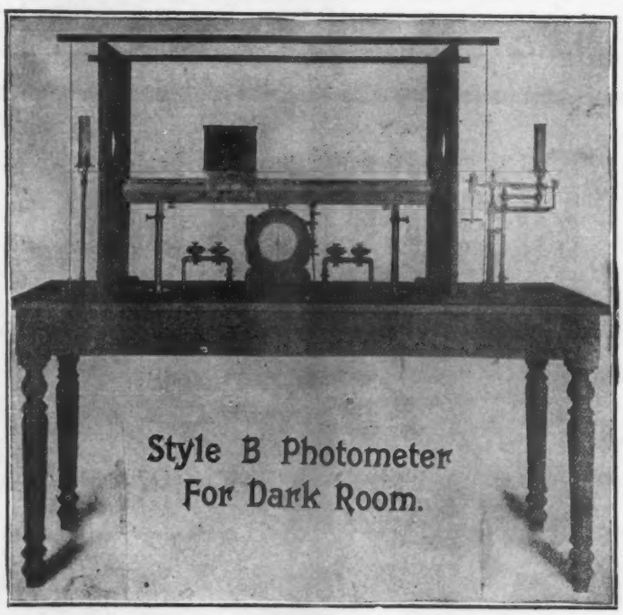
Day of Week.	Date.	Light.	Extinguish.
Mon.	1	7.50 PM	3.30 AM
Tue.	2	7.50	3.30
Wed.	3	10.20	3.30
Thu.	4	10.50	3.30
Fri.	5	11.20	3.30
Sat.	6	11.50 FQ	3.30
Sun.	7	12.20 AM	3.30
Mon.	8	12.40	3.30
Tue.	9	1.10	3.30
Wed.	10	1.40	3.30
Thu.	11	2.10	3.30
Fri.	12	2.50	3.30
Sat.	13	No L.	No L.
Sun.	14	No L. FM	No L.
Mon.	15	No L.	No L.
Tue.	16	8.00 PM	10.50 PM
Wed.	17	8.00	11.40
Thu.	18	8.00	12.20 AM
Fri.	19	8.00	1.00
Sat.	20	8.00 LQ	1.30
Sun.	21	8.00	2.00
Mon.	22	8 00	2.20
Tue.	23	8.00	2.50
Wed.	24	8.00	3.20
Thu.	25	8.00	3.30
Fri.	26	8.00	3.30
Sat.	27	8.00	3.30
Sun.	28	8.00 NM	3.30
Mon.	29	8.00	3.30
Tue.	30	8.00	3.30

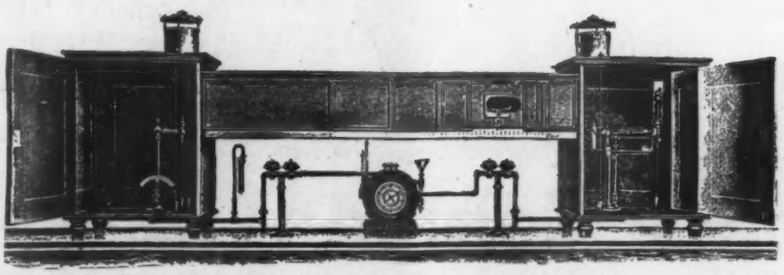
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs.Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

JUNE, 1908.

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A.M.
Mon.	1	7.12	3.17
Tue.	2	7.12	3.17
Wed.	3	7.12	3.17
Thu.	4	7.17	3.12
Fri.	5	7.17	3.12
Sat.	6	7.17	3.12
Sun.	7	7.17	3.12
Mon.	8	7.17	3.12
Tue.	9	7.17	3.12
Wed.	10	7.17	3.12
Thu.	11	7.17	3.07
Fri.	12	7.17	3.07
Sat.	13	7.17	3.07
Sun.	14	7.17	3.07
Mon.	15	7.17	3.07
Tue.	16	7.17	3.07
Wed.	17	7.17	3.07
Thu.	18	7.22	3.07
Fri.	19	7.22	3.07
Sat.	20	7.22	3.07
Sun.	21	7.22	3.07
Mon.	22	7.22	3.07
Tue.	23	7.22	3.07
Wed.	24	7.22	3.07
Thu.	25	7.27	3.07
Fri.	26	7.27	3.07
Sat.	27	7.27	3 07
Sun.	28	7.27	3.07
Mon.	29	7.27	3.07
Tue.	30	7.27	3.07

TOTAL HOURS DURING 1908.

	Hrs.Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

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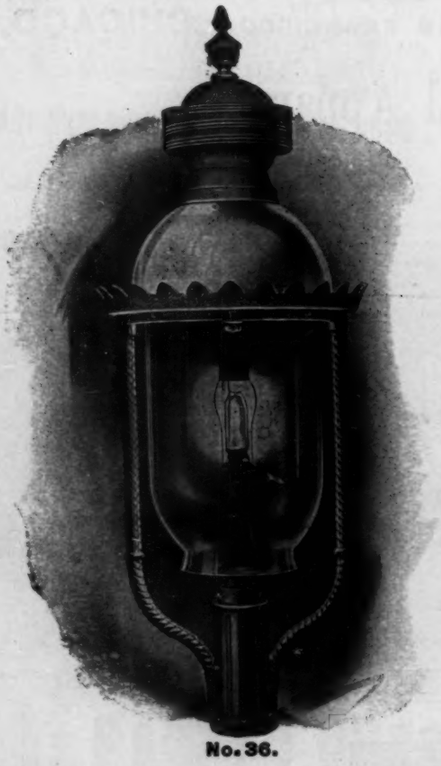

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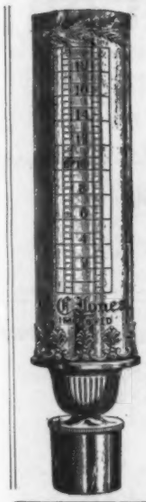

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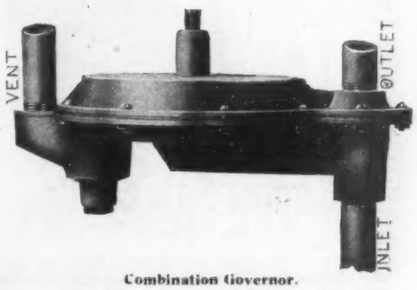

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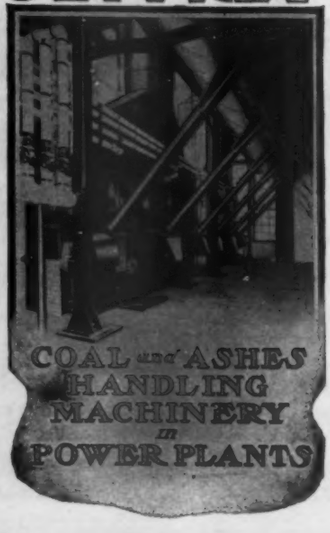

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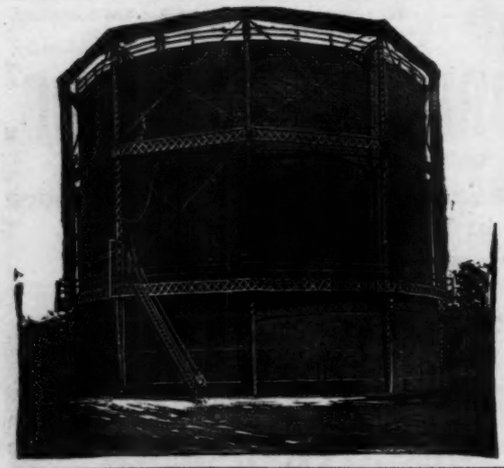

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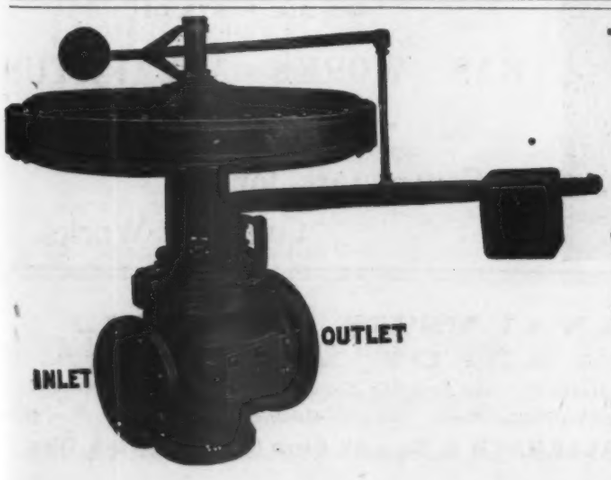

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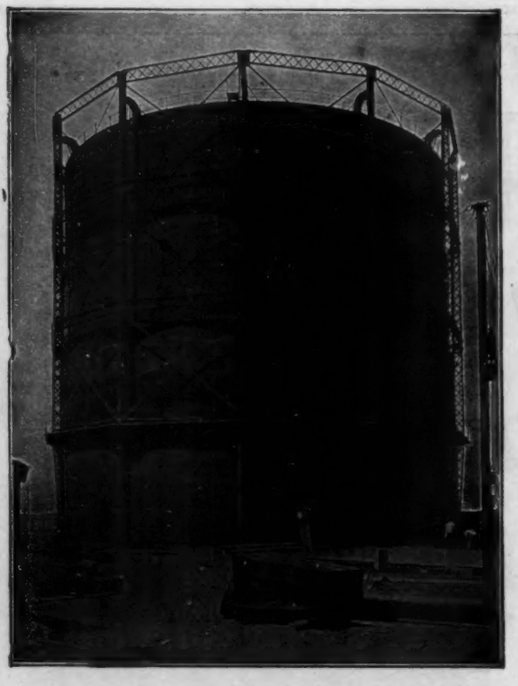

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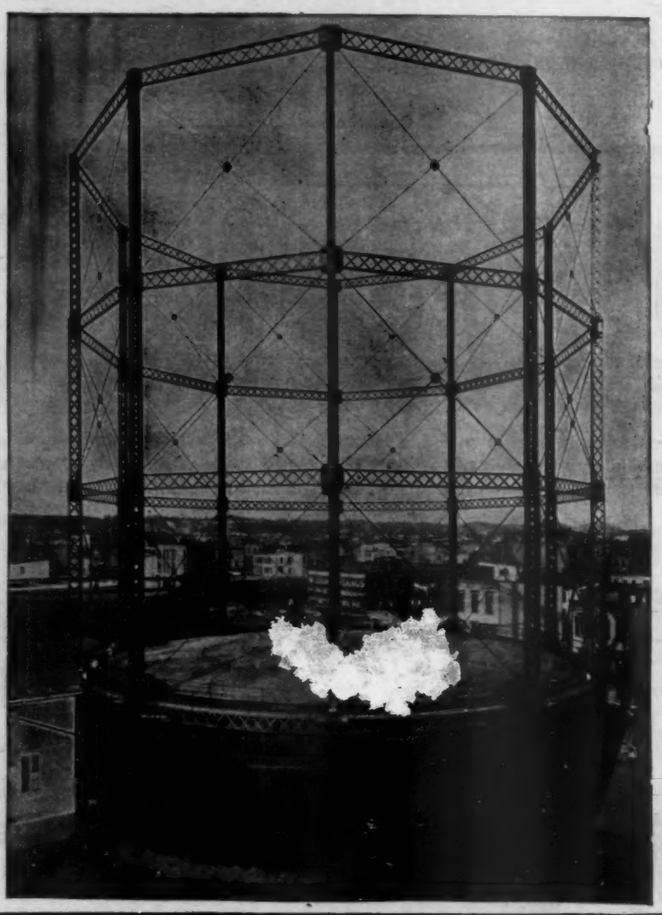

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